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Periodontitis & Peri-implantitis Management; Can We Restore It???

Periodontitis and peri-implantitis are major reasons for tooth and implant loss, respectively, and up to date, no conclusive treatment plan is suggested. Despite decades of research, development and education, the global burden of severe forms of periodontitis continuously increases and remains substantially high. Regarding peri-implantitis uncountable different case definitions have been circulating in the past years, impeding a clear picture of the actual prevalence rate, but approximately every fifth to fourth patient is affected. An overall picture will hopefully become clearer in the future due to diagnostic advances with the inclusion of peri-implant diseases and conditions in the currently said 2018 classification. However, considering the aging population with associated systemic comorbidities and tooth loss, and the increasing number of implants being globally placed per year, peri-implant diseases will certainly confront us with important health-economic issues.



Periodontitis and peri-implantitis do not only have a devastating effect on the biological tooth, respectively, implant status and survival, but also on the overall patients' quality of life and systemic diseases. Therefore, both diseases represent a financial burden for the patients as well as for the health care system rendering disease prevention as our pivotal goal. However, we will be inevitably faced with a variety of clinical consequences from both diseases, which drives us to improve prophylaxis and treatment outcomes. Based on the efforts of the European Federation of Periodontology, S3 level clinical practice guidelines have been published for stage 1–3 periodontitis patients and are in progress for stage 4 periodontitis patients. Such guidelines should help clinicians in decision making and point out for researchers the current state of knowledge as well as potential knowledge gaps and thus put a more distinct light on future clinical and scientific strategies. At present ITI guidelines of for Implantology as a whole is most praiseworthy and accountable. So profound knowledge about the present etiology, pathogenesis and management of Periodontitis and Peri-implantitis patients and use of advanced daiagnostic and surgical equipment and instruments is a must in today's scenario.

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A Journal of Advanced Dentistry





Evolving Trends in Prosthodontics: A Brief Review

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Abstract

Dental professionals now focus on implementing modern IT solutions in their everyday practice as it leads to increased efficiency, cost reduction, and higher patient satisfaction. The technological advancement such as CAD/CAM software already enables for excellent communication between dentists, technicians, and patients. Specialists need to change their way of thinking about and acting in the future. One has to structure the new Prosthodontics not only by improving traditional Prosthodontic treatment including the development of new materials and clinical techniques, as well as the evolution of a creative Prosthodontics that is linked to the advancement of related fields such as brain science, regenerative medicine, nanotechnology, bioinformatics, sleep science, and nutrition science. Furthermore, epidemiological studies should be used to improve evidence-based methods to prosthodontic care.

Keywords: Bioinformatics, Digitization, Nanotechnology, Stem cell technology.

Introduction

Evolution in technology and science has led to enormous advancement in the field of Prosthodontics especially with the progress in laboratory technology, clinical techniques and the field of biomaterials. Prosthodontics would continue to change with emerging concepts, materials and patient's needs. Prosthodontics is the branch of dentistry concerned with the implications of congenital or acquired loss of oral tissues, as well as the procedures for determining if artificial devices constructed of alloplastic materials do more help than damage.

With the increasing awareness in oral health and improvement in oral hygiene practices there has been a shift in edentulism with more number of people retaining more teeth. The focus of prosthodontics has shifted from removable prosthesis to fixed prosthesis.^[1]

Advancements in Technology

Many technological advancements and new techniques have been adopted by the profession of prosthodontics to improve its ability to restore patients' dental health to a level of precision and predictability previously unattainable. Devices with digital or computercontrolled components are used in digital technology.^[2]

Digital dentistry will grow more userfriendly in future as technology advances, allowing dental practitioners to work even more intelligently than before. The coming decade would be stormed and effected by digital technology and would see the following trends. (Fig. 1)

2	CAD/CAM
5	Clinical microscopy and magnification
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(b) Clip	aical Dentistry (i) Intraoral impressions (ii) Cast
(b) Chi duplica	tion (iii) Pastaration fabrication (iv) Customdontal
implan	te abutments and restorations (v) Guided implant
mpian	. (v) Guided implant
surgery	Occlusion Analysis Eg Taksoon Cardiar compact
5	Electronic shade metching
5	Lasers soft and hard tissue
6	Nanotashnalagy
	Canatias
	Information management systems
5	Banid prototyming
5	Virtual articulators
5	CBCT
5	Swept-Source Optical Coherence tomography (SS-OCT)
Ś	Laser-induced Fluorescence
, j	Laser Photothermal Radiometry (PTR)
Ś	Ultrasonography
, j	Infrared spectroscopy for multiple inflammatory
ŕ	narameters
×	3D Printing techniques
≻	Optical scanning of teeth (Digital impressions)
≻	Direct Metal Laser Sintering (DMLS)
≻	Tissue Engineering, and
≻	Computer-aided Educational Systems:
	(a) Haptic Technology
	(b) Just-in-time Learning Digital trends

Nanotechnology

In recent years, nanomaterials have gained more and more attention because of their unique properties and structures. The concept of "nonmaterial" formed in the early 1980s, referring to zero-dimensional, one-

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dimensional, two-dimensional, and three-dimensional materials with a size of less than 100? nm.^[3]

Nanomaterial has small size, large surface area, high surface energy, a large proportion of surface atoms, and four unique effects: small size effect, quantum size effect, quantum tunneling effect, and surface effect. Development of nonmaterial has greatly enriched the field of research in materials science including biomaterials. As people understanding of natural biological material properties and microstructure at nanoscale is gradually deepening, the role of nonmaterial in biomedical material science is gaining more importance.^[2,3]

Modification of titanium implant surfaces into nanostructures has been found to improve their biological integration with surrounding soft and hard tissues. Dorkhan et al. modified the surface of titanium implant by anodic oxidation into nanoscale with pores in the 50? nm range and found that both the vitality and the adherence level of soft-tissue cells, such as keratinocytes and fibroblasts, on the nanostructure surfaces were similar to those on pure titanium, while the attachment of oral streptococci on the nanostructure surfaces was significantly lower than on the pure titanium, suggesting that the nanostructure surfaces of metal implants might be capable of improving surrounding host tissue cell adherence while minimizing bacterial attachment.

Nanoceramics Materials in Prosthodontics

Nanoceramic means ceramic material with nanoscale dimensions in the microstructures phase. Nanoceramics exhibit unique features when compared to traditional ceramics, making them a popular topic in material science research.

To begin with, nanoceramics are super plastic. Ceramic is a brittle material in general, however nanoceramic has good toughness and ductility. Although the atom arrangement in nanoceramics interfaces is perplexing, the atoms are relatively easy to migrate under force deformation situations.^[4]

Secondly, compared to the conventional ceramics, nanoceramic has the superior mechanical properties, such as strength and hardness increasing significantly. Many nanoceramics have a hardness and strength four to five times greater than traditional materials.^[2] Because of their excellent mechanical and electrical properties, carbon nanotubes (CNTs) have gotten a lot of attention as material reinforcements. Furthermore, CNTs have been considered as reinforcing elements in ceramic matrix composites due to their unique mechanical proper.

In dentistry, plaque formation onto PMMA-based resins is a common reason of oral cavity infections and stomatitis. Some researchers showed that the incorporation of metal nanoparticles such as TiO_2 , Fe_2O_3 , and silver to PMMA resins could increase the surface hydrophobicity to reduce bimolecular adherence. In current years, metal oxide nanoparticles (e.g., TiO_2 , silver) have been extensively studied for their performances as antimicrobial additives. Mainly, TiO_2 nanoparticles are now considered as a low-cost, clean photocatalyst with chemical stability and nontoxicity.^[5]

Laura et al. prepared the PMMA composites, adding TiO_2 and Fe_3O_2 nanoparticles, for simultaneously colouring and/or

improving the antimicrobial properties of PMMA. As compared to standard PMMA, PMMA containing nanoparticles showed a less Candida albicans cells adhesion and a lower porosity. Because high porosities have been considered a major drawback for PMMA in Prosthodontics applications, metal oxide nanoparticles can be a suitable additive for the improvement of PMMA formulations. These findings suggested that nanostructured metal colouring additives could be a promising way to create nontoxic hybrid materials with antibacterial properties for use in dentistry. Despite the large number of studies on nanoresins, the majority of them are basic research. We anticipate that nanoresin will be widely employed in clinical prosthodontics in the near future.^[5]

Stem Cell & Tissue Engineering

Oral epithelial and mesenchymal stem cells can be easily collected as discarded biological materials. Their outstanding regeneration abilities can be used in a variety of regenerative medicine fields, not just dentistry.

The oral stem cells show their capability to repair cornea, dental pulp, periodontal, neural, bone, muscle, tendon, cartilage, and endothelial tissues without neoplasm formation. Despite these experimental studies confirming the regenerative potential of oral stem cells, the majority of them lack strict quantitative analysis for examining these cells' ability to self-renew, proliferate, and differentiate, particularly in vivo.

Stem cell and tissue engineering procedures are expected to provide a capability to regenerate large defects in periodontal tissues and alveolar bone, and ultimately replace the lost tooth itself. The tissues and organs targeted for such regenerative medicine strategies in dentistry include the salivary gland, tongue and craniofacial skeletal muscles, as well as the condylar cartilage of the temporomandibular joint.^[6]

Tooth Regeneration

The regeneration of adult teeth will be possible in future with the help of tissue engineering and newer expansion in stem cell therapy. Regenerative procedures would be improved substitutes in place of dental implants.

Experimental studies on animal models have revealed that the tooth crown formation can be regenerated using tissue engineering techniques that combine stem cells and recyclable scaffolds. Epithelial mesenchymal exchanges are important in tooth development. The reciprocal exchange of signals between these two native germ layer tissues is considered in these exchanges, which results in the creation of distinct terminal phenotypes with their supporting cells.^[6]

Bioinformatics

The informatics revolution will eventually revolutionize the way we practice dentistry. By merging scientific and clinical disciplines to encourage advancements in treatment, risk assessment, diagnosis, therapies, and oral health-care outcomes, this convergence will play a critical role in constructing a bridge of opportunity.

Bioinformatics has been an emerging field in the biomedical research and has been gaining attraction in dental field. This field

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has produced a continuous stream of large and complex genetic data, which has changed the way clinical and basic researchers approach genomic research. Oral genomics, as it is known in dentistry, can help with the molecular understanding of the genes and proteins, as well as their interactions, pathways, and networks, that are involved in the genesis and progression of oral diseases and disorders.^[7]

Discussion

Dental professionals will need a whole new set of abilities as a result of the digital revolution in dentistry. Who is performing what procedure in the dental workflow is changing in the dentistry profession. Even though the artistic aspect of the dental process remains, the instruments have changed, and the dental restoration is now a matter of digital handicraft skills. The distinction between labs and milling centres is beginning to fade now as the digital technology such as scanners, computer software, and milling machines have entered the labs.^[8]

Clinicians employ digital equipment in their offices to design and mill prosthesis restorations (in simpler cases such as the production of temporary restorations or single crowns). This enables dentists to give dental restorations to patients without the assistance of a laboratory or milling centre. As a result, there will be more pressure on dental practitioners to work as a single unit, providing comprehensive in-office services. Consequently, dental education schools and programs will have to increase their focus on how to master digital equipment such as CAD/CAM technologies to educate students in clinical settings.^[9]

Digital technology and an open digital workflow has led to an increased need for a wider range of dental materials on the market; fabrics, surfaces and colours as well as multi-layer materials. More research on the clinical behaviour, applications and biomechanical characterization of new dental materials is necessary for dental professionals to increase their knowledge and application techniques.^[10] (Fig. 2)







The norms and regulations for digital dentistry will evolve as technology advances. With time, the approval process for manufacturing dental components and using digital equipment will most likely become more stringent. This is a good thing since dental enterprises will have to provide validated goods and follow validated work processes, which will improve patient safety.^[11]

Manufacturers and practitioners will need to prepare for inspections from authorities and notified bodies, who will approach the dental business in the future with a greater number of inspections.

Conclusion

The increasing resources devoted to education, research and technological development has led to significant advances in the field of Prosthodontics. A concentration on advancing high technology in prosthodontics and related areas is likely to continue in many areas. The way a Prosthodontic professional will respond to this macro perspective is not easy to foretell. Whatever happens, it should at least be hoped that these factors are reflected in the future development of education and research in prosthodontics even if available data and current trends do not convincingly point yet in this direction.

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A Case Report on Management of Pseudo Gingival Pockets By Phase 1 Periodontal Therapy

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Abstract

Gingivitis and Periodontitis are the two most common diseases as confined to the field of Periodontology. Gingivitis is defined as the inflammation of gingiva but without the loss of the clinical attachment. Whereas Periodontitis is defined as the extention of inflammation into the supporting tissues of the teeth with the loss of the clinical attachment. Though gingivitis is characterized by the absence of clinical attachment loss, one thing that is common to both gingivitis and periodontitis is sometimes the present of pockets in case of gingivitis, a part from periodontitis. The pocket that occur in gingivitis are both the pseudo pockets and true pockets. Present case report is on a 26 years old female who reported to the department of Periodontology with the chief complaint of bleeding gums from the lower front tooth region. Upon examination it was found that the patient had stage 2 gingivitis, which was treated by thorough scaling, curettage, and root planing , leading to resolution of gingivitis which gave us the conclusion, that the pockets were pseudo in nature and can be treated well with the phase 1 periodontal therapy.

Keywords: gingivitis, pseudo pockets, scaling, rootplaning, curettage

here are nine speciality in dentistry

to which the dentistry is confined.

Introduction

These nine special branches ranges from root canal, extractions, oral health awareness, malocclusion treatment, diagnosing oral diseases clinically, and his to pathologically to correcting diseases of gums. As far as correcting the diseases related to gums is concerned, the speciality is called as Periodontology. Periodontology is a speciality of dentistry that deals with the structure surrounding and supporting the tooth. The surrounding structure around the tooth is known as gingiva whose main function is to protect the underlying supporting structures and the supporting structures are periodontal ligament, cementum, and alveolar bone, whose main function is to firmly hold the teeth in its socket.1 In the field of Periodontology two types of diseases are prevalent. The first one is called as gingivitis, which if not treated on right time can progress to periodontitis. The difference between gingivitis and periodontitis is based upon the fact that gingivitis refers to the inflammation of the gingiva without the loss of clinical attachment and periodontitis refers to the extension of inflammation from gingiva to the supporting structures of teeth leading to the clinical attachment loss. However one thing that is common to both gingivitis and periodontitis is the presence of pockets in the advanced stages of disease along with signs and symptoms of inflammation.² However this pocket can either be pseudo pocket or true pocket in case of gingivitis and definitely a true pocket in case of periodontitis. The difference between a pseudo pocket and a true pocket is based upon the fact that in case of pseudo pocket there is no clinical attachment loss and the pseudo pocket get resolved, once the etiological factors pertaining to inflammation is removed. But if such pockets persist even after the etiological factors are removed then such pocket is called as true pocket with a definitive clinical attachment loss.³

Manden

A CASE REPORT

Classification of Periodontal Pockets⁴

A. Based upon the coronal or Apical displacement of gingival margin





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- B. Based upon number of tooth surfaces involved:
- 1. Simple Pocket: involve only one tooth surface
- 2. Compound Pocket: Involve two or more surfaces of tooth

3. Complex Pocket: Such type of pocket originate on one tooth surface, twist around the tooth to involve one more additional tooth surfaces. These types of pockets are more common in furcation area.

Treatment options for the management of Pseudo Gingival Pockets:⁵

Since as mentioned previously, pseudo gingival pockets are very well differentiated from true pocket in terms of the absence or presence of clinical attachment loss. Hence clinical attachment loss do not occur in pseudo gingival pockets, hence these pockets are better managed non-surgically,though sometimes esthetic surgical intervention is necessary to restore the gingival contour, in order to prevent the redeposition of plaque and calculus and thus the prevention of recurrence of pseudo gingival pockets. Following are the treatment options available for the management of pseudo gingival pockets:

1. Scaling and root planing- forms an essential component of phase 1 Periodontal therapy. Since the main etiological factor for the formation of pseudo gingival pockets is the plaque and calculus, hence the removal of these etiological factors are of utmost concern in order to restore the gingival health. Scaling refers to the removal of plaque and calculus from the tooth surface without any attempt to alter the necrotic root cementum. Since during gingivitis, there is an alteration in the structure of root centum leading to the deposition of toxins from microbes which further deteriorate the gingival health. So in order for the establishment of soft tissue health surrounding the tooth, root planing is done as root planing refers to the removal of necrotic cementum from the root surface.

2. Curettage- if the gingival tissues does not comes to their normal consistency, that is firm and resilient, even after thorough scaling and root planing, then the procedure called as curettage is indicated, which refers to the removal of inflamed pocket epithelium by the scraping of the soft tissue wall of the pocket by means of curette and the procedure is done mainly under local anaesthesia.

3. Gingivoplasty- Sometimes even after thorough scaling, root planing, and curettage, the scalloped contour is not obtained though consistency becomes firm and resilient. So in such cases, gingivoplasty is the necessity in order to prevent the accumulation of plaque and calculus, and the recurrence of pseudo gingival pockets. Gingivoplasty refers to the reshaping of the gingiva just as one do in festooning of a denture.

Case Report

Present case report is on a 28 years old female patient, who came to the Rishiraj college of Dental Science and Research centre, Bhopal, in the department of Periodontology with the chief complaint of swollen and bleeding gums while brushing from the lower front tooth region. Upon the examination, the patient was systemically healthy, the gingival tissues in lower

front tooth region was positive for bleeding upon probing, gingival tissues were soft and oedematous in consistency, contour was rounded, color was reddish, stippling was absent, and there was a heavy deposits of plaque and calculus. So based upon the examination carried out, a diagnosis of chronic localized gingivitis was made with respect to 31,32,33,41,42,43. So based upon the diagnosis, it was decided to initiate the treatment with phase 1 therapy which include thorough scaling, rootplaning, and curettage. Gingivoplasty was initially planned for this case but later on the gingivoplasty was not needed as the patient shown an excellent response to phase 1 therapy with the complete restoration of gingival health which further leads to the conclusion, that the pockets were pseudo in nature. Patient upon maintainance phase herself reported that she does not have bleeding upon brushing ,shedoesnot feeling any swelling of the gums, and she was able to brush very well from lower front tooth region, without any difficulty.



Fig 1. Gingival pseudo pockets with soft & oedematousconsistency, rolled out blunt gingival Margins, absence of stippling, redness, accompanied By bleeding upon brushing by patient.



Fig 2. At follow up one week after Treatment with resolution of all signs of gingival inflammation and pseudo pockets as well restoration of gingival health Summary & Conclusion

Gingivitis occur in its various forms, such as sometimes it is an simple inflammation, sometimes it is an inflammatory hyperplasia and sometimes, true periodontal pockets. In the present case report, the patient had an gingival inflammatory hyperplasia of mandibular incisors. The etiological factor which contributed to this type of hyperplasia was the plaque and the calculus which resulted in all signs and symptoms of gingival inflammation. Assuming it to be an inflammatory hyperplasia of gingiva due to plaque and calculus deposition, the treatment was





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begin with a golden rule of periodontics that is scaling, and root planing initially, which was followed by curettage in the later stage. Gingivoplasty was also planned for this patient because of a doubt of restoration of normal gingival contour, however upon the maintainance phase, the inflammatory hyperplasia of the gingiva was resolved, leading to the resolution of all the normal clinical features of gingiva and the conclusion was made that the inflammatory hyperplasia of the gingiva was pseudo in nature as it resolved after being treated by phase 1 periodontal therapy. Thus this review and case report leads to a conclusion that how crucial the role plaque and calculus have in gingival inflammation leading to all the functional and esthetic problems such as swollen gums, badbreathe, bleeding upon brushing, esthetically unpleasing. Thus it is the responsibility of the clinician to provide a thorough treatment for the normal restoration of function of a patient as well it is an utmost responsibility of the patient to take care of his or her oral health in the same way as he or she takes care of his or her systemic health as the oral health is the mirror of the systemic health.

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The Temperature Changes Within the Pulp Chamber With **Different Stripping Procedures- A Short in Vitro Study**

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Abstract

Objective: To measure the temperature changes in the pulp chamber when different stripping procedures were used without any type of coolant.

Materials & Method: Extracted human teeth were used in this study. The teeth were separated into five groups. Mesial and distal sides of the teeth were used separately. The stripping procedures were performed on premolars with a metal handheld stripper, stripping disk, or tungsten carbide bur diamond bur. A J-type thermocouple wire was positioned in the centre of the pulp chamber and was connected to a data logger during application of stripping procedures.

Result: According to one-way ANOVA, temperature rise in the pulp chamber varied significantly depending on the stripping procedure (P < 0.001). The null hypothesis proposed in our study was rejected as stripping procedure elevated the temperature in the pulp chamber significantly (P<0.001).

Conclusion: Frictional heat is a common side effect of stripping procedures.

Dept. of Orthodontics & Dentofacial Orthopedics, Keywords- Interproximal stripping, thermal changes, pulp chamber, burs, disk

Introduction

T tripping is defined as the act of clinically removing part of enamel from an interproximal contact area. Dept. of Orthodontics & Dentofacial Orthopedics, By this procedure, space is created to align teeth and teeth can be reshaped to more ideal form. This also may improve aesthetics, improve the gingival relationship, and eliminate the need of lower retention and is used for correction of curve of Spee and camouflage Class II and III malocclusions. Because this procedure has become more routine in orthodontics practice, several studies evaluated the detrimental effects of stripping. According to Twesme et al¹ increasing susceptibility of proximal enamel surface to demineralization and also to caries, Radlanski et al² also showed that furrows resulting from the stripping caused increased plaque accumulation and Joseph et al³ states that these furrows would remain permanently on enamel surface with no change of natural healing mechanisms aiding in the repair. On the other hand, Crain and Sheridan⁴ and Sheridan and Ledoux⁵ suggested that stripped posterior surfaces are no more susceptible to caries or periodontal disease than unaltered surfaces but recommended sealant application for caries protection. Another possible side effect of stripping is the heat generation during this procedure. Therefore, Zachrisson and Shedridan⁶ emphasize cooling during stripping

to prevent the possible damaging effect of frictional heat during air rotor stripping and indicator wire to prevent bleeding, thus getting better visibility. In general, temperature increases more than 5.5°C in the pulp lead to inflammation. Investigation have shown that it is, A fibres rather than C fibres that are activated by hydrodynamic stimuli(e.g., heat, cold, air blasts) applied to exposed dentine⁷. Slow heating of tooth produced no response until the temperature reached 111°F(43.8°C), at which time C fibres were activate.

Materials & Method

Ten intact, freshly extracted human teeth were used in this study. To evaluate temperature changes in teeth with different stripping procedures. The root portion was sectioned with a carborundum disk approximately 4mm below the CEJ. The pulpal chamber was enlarged as needed to insert the thermocouple wire with Gates glidden files⁸. The pulp chamber was cleaned of remnants of soft tissue with a spoon excavator and sodium hypochlorite application for 1 min. Pulp chamber was filled with silicone transfer compound⁹. Teeth were placed on acrylic blocks of teeth each labelled according to tooth group and stripping procedure. Group 1: A tungsten small tapered fissure carbide bur (Raintree Essix Inc) was used on mandibular premolars at high speed (above 20,000 rpm)

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with a contra-angle hand piece. Group 2: A diamond small tapered fissure was used on premolars at high speed (above 20,000 rpm) with a contra-angle hand piece for 10 seconds. Group3: A tungsten small tapered fissure carbide bur was used on premolars at high speed (above 20,000 rpm) with a contra-angle hand piece

for 10 seconds. Group 4: A perforated stripping disk at low speed (below 15,000 rpm) with a contra- angle hand piece for 10 seconds.Group 5: A metal handheld stripper (LSDSM6M, double side 6 mm, was used (20 strokes for each tooth) on premolars



Result

According to one-way ANOVA, temperature rise in the pulp chamber varied significantly depending on the stripping procedure (P<0.001). The null hypothesis proposed in our study was rejected as stripping procedure elevated the temperature in the pulp chamber significantly (P<0.001).





Analysis of Variance (ANOVA) between the 5 groups									
Source	DF	Adj SS	Adj MS	F- Value	P- Value				
Factor	4	13.58	3.395	176.36	0				
Error	5	0.0963	0.01925						
Total	9	13.6763							

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Factor	N	Mean	Grouping			
Disc	2	3.85	A			
Microstripper	2	2.45		В		
Bur2	2	2.05		В	С	
Bur1	2	1.8			С	
Strip	2	0.225				D

Discussion

In this in vitro study the heat generated by different stripping procedures were measured. If one also takes into account that even a few seconds of external thermal stress with a temperature of 27.5°C has the potential to produce irreversible pulp damage, it becomes obvious that the pulp tissue is very susceptible to thermal stress even within a short time¹⁰. For the present comparative study, extracted adult premolars were selected to assess the thermal changes in different stripping procedures. This procedure was followed by elimination of any possible structural variables of teeth that may manifest as differences in the thermal conductivity and specific heat¹¹. On the other hand, the teeth used in this study were collected from an adult sample¹⁵, so the thermal conduction to the pulp chamber during stripping procedures might have been limited compared with the actual scenario in orthodontic patients who are usually 13–16 years of age¹². Therefore, one would expect to record higher temperature increases when younger teeth are used for a similar study^{13,14}. Thermocouples were selected to evaluate temperature alterations during the removal of the remnant adhesive because of high precision and reliable readings associated with this technique in orthodontics and operative and prosthetic dentistry.^{16,17,19,23,24} Trauma to the pulp and dentin during the use of rotary instruments results from several factors.^{25,26} The pressure,¹⁹ revolutions per minute,¹⁹ bur design, and type of coolant²⁷ influence the temperature rise and the degree of vibration. The various clinical reactions of the pulp and dentin are attributed to the interrelated factors. Schuchard²⁸ and Sato²⁹ reported that excessive heat adduction can result in structural changes to the hard dental tissues and damage the dental pulp. Zach and Cohen¹⁶ reported that a 5.5°C rise led to necrosis of the pulp in 15% of teeth, an 11.1°C rise resulted in necrosis of the pulp in 60% of teeth, and a 16.6°C rise led to necrosis of the pulp in 100% of teeth. A soldering iron was applied to the tooth surfaces to produce the temperature rise. Because the temperature rise does not appear to have been monitored after removal of the soldering iron, the results must be treated with caution. To standardize procedures for the study, 20 strokes were performed for metal strips, and 10 seconds of application was preferred for perforated discs and carbide burs. Sheridan⁸ stated that initial tooth structure reduction lasts for 30 seconds and must be performed with cooling. Robinson and Lefkowitz,³⁰ Taira et al,³¹ and Moulding and Loney³² reported that cooling techniques, such as the use of an airwater spray, were effective in limiting the temperature rise in the pulp chamber. According to individual needs, stripping duration or number of strokes may differ, so the temperature change may exceed the critical level of 5.5C. The condition and quality of the pulpal vascularity may determine the degree of damage caused by thermal trauma.³³ Zachrisson¹⁵ suggested an air stream to reduce pain during gross recontouring. It has been concluded that painful stimulation can induce significant increases in blood flow in the region adjacent to the stimulus.³⁴ In clinical conditions, pain during stripping may increase temperature in the pulp chamber. The experimental design of the present study did not consider heat conduction within the tooth during the in vivo stripping process because of the effect of blood circulation in the pulp chamber and fluid motion in the dentin tubules.³⁵ In addition, the surrounding periodontal tissues can promote heat convection in vivo, limiting the intrapulpal temperature rise.³⁶ Although a potential hazard to dental pulp may exist with stripping procedures, only a well-designed histological study can accurately assess the actual damage to the pulp or odontoblasts. The data on temperature elevation recorded while preparing extracted teeth have limited applications in determining pulpal reactions. However, it is advisable to use intermittent spray cooling with stripping procedures

Conclusion

A.Mean temperature changes did not exceed the critical level of 5.5° C in all the stripping procedures. B. metal strip used on teeth seems to be the safest procedure for thermal changes in the pulp chamber. C. Stripping procedure done with a disk showed greater temperature rise among all the procedures. D. Clinicians must be aware of the detrimental effects of heat during stripping, and air cooling should be preferred because of greater visibility than with airwater spray.

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Relationship Between Maternal Periodontitis & Adverse Pregnanacy Outcomes- An Ambispective Study

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Abstract

Introduction: Pregnancy is normally a healthy physiological process that sometimes has adverse outcomes including low birthweight (<2500 g) or very low birthweight (<1500 g), pre-term birth (<37 weeks or very pre-term <32 weeks), growth restriction (weight for gestational age), pre-eclampsia, miscarriage and/or still birth.

Aims & Objective: To correlate the association between periodontal diseases in post-partum mother as a prospective risk for preterm and / or low birth weight babies to assess maternal periodontal status among pregnant women to assess reduction in prevalence of preterm / or low birth babies after treatment of maternal periodontitis.

Materials & Methods: An ambisecptive study case control design is chosen by including 100 mothers, aged 18-35 years with in a period of 4 months prior delivery and 48 hours after the birth of their child in case and control group respectively.

Results: This study indicated a 4.66 fold increase in PTLBW in cases of periodontal infection with CPI score \geq 3 in comparison to periodontal infection with CPI score \leq 3. Other workers observed 4.5 to 7 fold increase in incidence of PTLBW in cases with CPI score \geq 3. The important observation made in this study was literacy of the mother plays a major role in causation of periodontal disease as well as to PTLBW.

Discussion: Preterm birth (PTB) and low birth weight (LBW) are the leading perinatal problems worldwide. Mothers who receive periodontal therapy during pregnancy would be better suited to decrease the chances of delivering a baby with PLBW. **Keywords:** Preterm birth, Low term birth

Introduction

regnancy is generally a healthy physiological process that typically has adverse outcomes including low birthweight (<2500 g) or very low birthweight (<1500 g), pre-term birth (<37 weeks or very pre-term <32 weeks), growth restriction (weight for gestational age), pre-eclampsia (commonly defined as maternal hypertension and proteinuria after the 20th gestational week), miscarriage and/or still birth.¹ Pregnancy is a delicate condition leading to different physiological changes in body structure, because of an increased production of different hormones such as oestrogens, progesterone, gonadotropins, and relaxine.² During pregnancy, the changes in hormone levels promote an inflammatory response that increases the risk of developing gingivitis and periodontitis. Even with good plaque control, 50%-70% of all women will develop gingivitis during their pregnancy, commonly referred to as pregnancy gingivitis, due to the variations in hormone levels. Pregnancy gingivitis generally manifests during the second and eighth month of pregnancy and is considered a consequence of the increased levels of the hormones

progesterone and estrogen, which can effect small blood vessels of the gingiva, making it more permeable.^{3,4} Pregnancy periodontitis can be observed as early as in 2nd month of pregnancy and may become worse in 8th month of pregnancy.⁵ Preterm birth, defined as delivery before 37 completed weeks (< 259 days) whereas full term pregnancy is around 40 weeks.⁶ Low Birth Weight is defined depending on whether the weight of the baby is < 2,500 g.⁷ Preterm infants who are born with a low birth weight are termed preterm low birth weight (PTLBW).⁸ Periodontal disease contribute to premature delivery and low birth weight as a result of pathogenic micro-organisms, or indeed their microbial products, such as lipopolysaccharide (LPS), reaching the uterus via the bloodstream, inducing cytokine release in the decidua or the membranes, resulting in increased prostaglandin production or, indeed, uterine muscle contraction. Inflammatory mediators such as cytokines and prostaglandins, when produced in the periodontal tissues or in other systemic organs in response to LPS stimulation, may also pose a real threat to the fetoplacental unit and increase the risk of preterm delivery and low birth

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weight.⁹ Infection is now considered one of the major causes of PTLBW deliveries, responsible for somewhere between 30% and 50% of all cases.¹⁰ Some reproducible factors associated with PTLBW are demographic factors such as, age, race, socioeconomic status, marital status, and behavioural factors as smoking, substance abuse, poor nutrition, excessive physical activity are included. Apart from these medical risk factors which includes, predating pregnancy, poor obstetric history, uterine or cervical malformations/myomas, and pregnancy complications such as multiple gestation, abnormalities in amniotic fluid volume, vaginal bleeding, fetal abnormalities, serious infection, and abdominal surgeries constitute and play a role in PTLBW.¹¹ The 1996 study by Offenbacher and colleagues suggested that maternal periodontal disease could lead to a seven-fold increased risk of delivering a preterm low birth weight (PTLBW) infant. These authors concluded that approximately 18% of PTLBW cases might be attributable to periodontal disease. Since then, researchers have investigated these possible associations for over a decade or more. Therefore it is important to understand the underlying biologic mechanisms for the relationship between periodontal disease and adverse pregnancy outcomes such as preterm birth and low birth weight to provide a rationale for therapeutic interventions and exploration of other methods that may be used as adjuncts to the standard treatment. his study was done to correlate the association between periodontal diseases in post-partum mother as a prospective risk for preterm and / or low birth weight babies to assess maternal periodontal status among pregnant women to assess reduction in prevalence of preterm/ or low birth babies after treatment of maternal periodontitis.¹

Materials and Method

This multicentre study was conducted in the Department of Periodontology and Oral Implantology, Rajasthan Dental College & Hospital, Jaipur in association with Department of Obstetrics and Gynaecology, Mahila Chikitsalya

Study Design

An ambisecptive study case control design is chosen by including 100 mothers, aged 18-35 years within a period of 4 months prior delivery and 48 hours after the birth of their child in case and control group respectively.

Patient Group

Two groups were prepared as

50 post-partum mothers - Control Group (periodontal intervention group)

50 pregnant mothers - Case Group (non periodontal intervention group)

Inclusion Criteria

- Pregnant mothers aged between 18-35 years.
- Pregnant and<22 weeks gestation at time of SRP

• Willing to be randomized, to complete treatment protocols and provide consent

- 2 or more sites measuring \leq 5mm probing depths (PD) and periodontal attachment loss of 1-2 mm

+20 teeth

• +18 years of pregnant women, uniparous or multiparous with no history or presence of systemic disease

Exclusion Criteria

• Patient with history of systemic disease such as cardio vascular disease or placental or uterine complications or any other medical problems that may affect the study outcome was excluded

Currently undergoing periodontal treatment

• Chronic regimen of aspirin or non steroidal anti-inflammatory drug

• 5 or more teeth requiring extraction

• Rampant decay or any other oral condition that, in the clinician judgement, would place the patient at unacceptable risk if treatment was delayed

• Chronic use of medications that cause gingival enlargement such as phenytoin, cyclosporin – or calcium channel antagonist

• Prescribed or using chlorhexidine or other mouth rinses with known anti-plaque or anti-inflammatory effect

Study Protocol

• All mothers were thoroughly briefed about the nature of the study and an informed consent was obtained.

• All the information gathered were recorded in a pre-designed Performa (Annexure-B).

• Each mother included in control group in the study was interviewed directly at the bed side. Information was collected about her qualification, age, family income and details about her husband, education and occupation. Adverse habits such as smoking, smokless tobacco use, alcohol consumption were also recorded for smoking and tobacco chew/paste, the type and form in which it was consumed was also noted.

• The post partum data was obtained from medical file. Information on the outcome of the current pregnancy was gathered from mother's medical record. The birth weight of the infant was also noted from the available infant and maternal record. The history of ypertension was noted from gynaecologist record.

• Periodontal clinical examination was carried out within 48 hours after delivery. The periodontal status of the mother was assessed by using community periodontal index (CPI Score) and Gingival Index (LOE & Silness).

• Each mother included in case group in the study was interviewed at the OPD time.

• Periodontal clinical examination was carried 4 months prior delivery upto delivery. The periodontal status of the mother was assessed by using Gingival Index (LOE & Silness) Plaque Index

Indicators

Three indicators of periodontal disease were used for the assessment: gingival bleeding, calculus and periodontal pockets. statistical Analysis or statistical analysis of observations, Chisquare test was applied. Data was analyzed SPSS software version 22. The correlation between the mean values of all clinical parameter GI, PI and CPI with PTLBW and NBW was done by Karl Pearson cofficent test.

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Results

The age group distribution of the mothers between 18-35 years in case and control group. The distribution pattern in age group 18 - 25 indicated 40 % mothers (20/50) in case group(n=50) and 56% mother (28/50) in control group (N=50)in the age group of 26 - 30 indicated 44% mothers (22/50) in case group and 40% mothers (20/50) in control group and in the age group of 31-35, 16% mothers (8/50) were in case group and 4% mothers (2/50) were in control group. In case group and control goup the selection of mothers was age-matched.

AGE GROUP (in yrs)	CASE GI	ROUP	CONTROL GROUP		
	No	%	No	%	
18 - 25	20	40.00	28	56.00	
26-30	22	44.00	20	40.00	
31-35	8	16.00	2	4.00	
TOTAL	50	100.00	50	100.00	



Table No. 1 Distribution According To Age of Mother of Case & Control Group



AGE GROUP	CASE GROUP	CONTROL GROUP
18-25	23.03 ± 0.89	23.33 <u>+</u> 0.92
26-30	28.65± 0.87	27.44 <u>+</u> 1.62
31-35	33.00 ± 1.51	32.00 <u>+</u> 1.41
18-35	26.00 ± 4.34	26.79 ± 4.68

Table No. 2 Mean ± Sd Age of Mother of Case Group & Control Group



	CASE G	ROUP	CONTROL GROUP		
	No	%	No	%	
PTLBW	18	36.00	3	6.00	
NBW	32	64.00	47	94.00	
TOTAL	50	100.00	50	100.00	

Table No. 3 Distribution According To Number of PTLBW & NBW Baby of Case & Control Group The table 3 describes the distribution of babies delivered according to birth weight in case and control group. Out of 50 babies delivered in case group (n=50), 36% babies (18/50) delivered were PTLBW and 64% babies (32/50) delivered were full term normal for gestation age. Whereas in control group 6% babies (3/50) were delivered with PTLBW and 94% babies (47/50) were delivered ad full term normal for gestation age. The statistical analysis indicated a significant correlation in both group (P < 0.05, Significant on Chi-square test).



Graph No. 3 Distribution According To No. of PTLBW & NBW Baby of Case & Control Group

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			С	р		Control (Group	
PTLBW			2303 ± 137			2344 <u>+</u> 109		
NBW 3117 ± 337 3290				3290 <u>+</u>	280			
Group	Ν	N	lean	Std. Deviation	" t- Valı	1e "	" p- Value"	Result
Case	50	2	303	137	1.656		> 0.0001	HS
Control	50	2	344	109				



AGE	CAS	SE GROUI)	CONTROL GROUP		
(YRS)	PTLBW	NBW	TOTAL	PTLBL	NBW	TOTAL
18 - 25	12 (24.00)	$ \begin{array}{c} 12 \\ (24.00) \end{array} $	24 (48.00)	(2.00)	20 (40.00)	21 (42.00)
26 - 30	4 (8.00)	18 (36.00)	22 (44.00)	$ \begin{array}{c} 1 \\ (2.00) \end{array} $	23 (46.00)	24 (48.00)
31 - 35	2 (4.00)	$^{2}_{(4.00)}$	4 (8.00)	1 (2.00)	4 (8.00)	5 (10.00)
TOTAL	18 (36.00)	32 (64.00)	50 (100.00)	$\frac{3}{(6.00)}$	47 (94.00)	50 (100.00)

Table No. 5 Distribution According To Age Group of Mothers & Birth Weight of Baby of Case & Control Group

Table 5 describes the distribution of deliveries of PTLBW and full term normal delivery according to the age group of mothers in case and control group. In control group, the babies delivered PTLBW and full term normal for gestation age were 2% (1/50) and 40% (20/50) respectively in the age group of 18 - 25, 2% (1/50) and 46% (23/50) respectively in the age group of 26 - 30, and, 2% (1/50) and 8% (4/50) respectively in the age group of 31 - 35. The statistical analysis indicated a significant correlation in both groups (P<0.05 on chi-square test)

Whereas in case group, the babies delivered PTLBW and full term normal for gestation age were 24% (12/50) and 24% (12/50) respectively in the age group of 18 - 25, 8% (4/50) and 36% (18/50) respectively in the age group of 26 - 30, and, 4% (2/50) and 4% (2/50) respectively in the age group of 31 - 35. The

statistical analysis indicated a significant correlation in both groups (P < 0.05 on chi-square test)









Education	Case G	Froup	Control Group		
Education	No	%	No	%	
Illiterate	29	58.00	12	24.00	
Primary	3	6.00	2	4.00	
Middle	2	4.00	3	6.00	
High School	1	2.00	2	4.00	
Higher Secondary	4	8.00	5	10.00	
Graduate	10	20.00	24	48.00	
Post Graduate	1	2.00	2	4.00	
Total	50	100.00	50	100.00	

Table No. 6 Distribution According To Educational Status of Mothers of Case & Control Group

Table 6 describes the educational status of mothers in case and control group. In case group (n=50), 58% mothers were illiterate and 20% mothers were graduate, whereas in control group (n=50), 24% mothers were illiterate and 48% mothers were graduate.

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Graph No. 7 Distribution According To Educational Status of Mothers of Case & Control Group

Educational Status	PTLBW		NE	W	Total	
	No.	%	No.	%	No.	%
Illiterate	15	30.00	14	28.00	29	58.00
Primary	0	0.00	3	6.00	3	6.00
Middle	0	0.00	2	4.00	2	4.00
High School	0	0.00	1	2.00	1	2.00
Hr. Secondary	0	0.00	4	8.00	4	8.00
Graduate & above	3	6.00	8	16.00	11	22.00
Total	18	36.00	32	64.00	50	100.00

Table No. - 7 Distribution According To Educational Status of Mothers & Birth Weight of Baby of Case Group Table 7 shows the distribution of mothers according to educational level and birth weight of baby in case group. Out of 50 mothers in case group, 29 mothers (58%) were illiterate and out of these 29 illiterate mothers, 15 mothers delivered PTLBW babies. The statistical analysis indicated a significant correlation in both groups (P<0.05 on chi-square test).



Graph No. 8 Distribution According To Educational Status of Mothers & Birth Weight of Baby of Case Group

SES	C	ase Group		Control Group		
	PTLBW	NBW	TOTAL	PTLBW	NBW	TOTAL
I	1	4	5	0	0	0
	(2.00)	(8.00)	(10.00)	(0.00)	(0.00)	(0.00)
П	4	20	24	0	35	35
	(8.00)	(40.00)	(48.00)	(0.00)	(70.00)	(70.00)
Ш	1 (2.00)	6 (12.00)	7 (14.00)	1 (2.00)	4 (8.00)	5 (10.00)
IV	11	2	13	2	7	9
	(22.00)	(4.00)	(26.00)	(4.00)	(14.00)	(18.00)
V	1 (2.00)	0 (0.00)	1 (2.00)	0 (0.00)	1 (2.00)	(2.00)
Total	18	32	50	3	47	50
	(36.00)	(64.00)	(100.00)	(6.00)	(94.00)	(100.00)

Table 8 shows that out of 50 mothers in case group, 22% mothers (11/50) in SES IV (upper lower SE class), delivered PTLBW, whereas out of 50 mothers in control group, 4% mothers (2/50) delivered PTLBW in SES IV (upper lower SES class).

Statistical analysis indicated that there is definite correlation between PTLBW and SES in case group (P < 0.05 Significant) whereas it is not significant in control group (P > 0.05 Not significant).



Graph No. 9 Distribution According To Socio Economic Status (SES) of Mothers of Case & Control Groups

CPI Score	Baseline	After Delivery
CPI=1	0	43 (86%)
CPI=2	0	7 (14%)
CPI =3	50	0
TOTAL	50	50

Table No. 9 Variation in Community Periodontal Index (CPI Score) of Control Group

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Graph No. 10 Variation in Community Periodontal Index (CPI Score) of Control Group

CDL Case Group			Control Group			
CPI Score	PTLBW	NBW	TOTAL	PTLBW	NBW	TOTAL
CPI Score=1	0	0	0	1	42	43
CPI Score=2	0	0	0	2	5	7
CPI Score=3	18	32	50	0	0	0
Total	18	32	50	3	47	50

Table No. 10 Distribution According To Community Periodontal Index (CPI Score) of Mothers & Birth Weight of Baby of Case & Control Group

Table 10 shows the distribution of mothers of case and control group according to CPI score and birth weight of baby. Out of 50 mothers in control group, 43 mothers (86%) were having gingivitis with CPI score 1. Out of these 43 mother, 1 mother (2%) delivered as PTLBW whereas 42 mothers (84%) delivered as full term normal for gestation age. Remaining 7 (14%) in control group were having gingivitis with CPI score 2. Out of these 7 mothers, 2 mothers (4%) delivered as PTLBW and 5 mothers (10%) delivered as full term normal for gestation age.

In case group, out of 50 mothers of case group (as per study protocol) all mothers (100%) were having periodontitis with CPI score 3. Out of these 50 mothers of case group, 18 mothers (36%) delivered as PTLBW whereas 32 mothers (64%) delivered as full term normal for gestation age.





Graph No. 12 Distribution According To Cpi Score of Mother & Birth Weight of Baby of Control Group

Dialy Eastern	Case Group			Control Group		
RISK Factor	PTLBW	NBW	TOTAL	PTLBW	NBW	TOTAL
Hypertension	4 (8.00)	12 (24.00)	16 (32.00)	0 (0.00)	2 (4.00)	2 (4.00)
Tobacco	6 (12.00)	6 (12.00)	12 (24.00)	0 (0.00)	3 (6.00)	3 (6.00)
Smoking	1 (2.00)	12 (24.00)	13 (26.00)	0 (0.00)	4 (8.00)	4 (8.00)
Alcohol	(2.00)	12 (24.00)	13 (26.00)	$\begin{pmatrix} 1 \\ (2.00) \end{pmatrix}$	2 (4.00)	3 (6.00)

Table No. 11 Distribution According To Associated Risk Factors of Mothers & Birth Weight of Baby of Case & Control Group

Table 11 is showing the role of other risk factors viz. Hypertension, Tobacco, Smoking and Alcohol in causation of PTLBW in mothers of case and control group. In case group out of 50 mothers, it was observed that 4 mothers were hypertensive (8%) delivered PTLBW babies





Birth Weight	Case Group	Control Group
PTLBW	4 (8.00)	0 (0.00)
NBW	12 (24.00)	2 (4.00)
TOTAL	16 (32.00)	2 (4.00)

Table No. 12 Distribution According To Hypertension of Mother And Birth Weight of Baby of Case & Control Group

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Table 12 shows the distribution of cases according to prevalence of hypertension in mothers in case and control group. Out of 50 mothers in case group, 16 mothers were having hypertension and out of these 4 mother delivered PTLBW babies and 12 mothers delivered as full term normal for gestation age. Whereas out of 50 mothers in control group, 2 mothers were having hypertension and both of them delivered full term normal for gestation age. Statistical correlation between HT of mother and PTLBW in both groups was non-significant (P > 0.05).



Birth Weight	Case Group	Control Group
PTLBW	1 (2.00)	1 (2.00)
NBW	12 (24.00)	2 (4.00)
TOTAL	13 (26.00)	3 (6.00)

Table No. 13 Distribution According To Alcohol Intake Habit of Mother & Birth Weight of Baby of Case & Control Group

Table 13 shows the distribution of cases according to mother's history of alcohol intake and birth weight of baby. One case was reported from the mother of case group and one case was reported from the control group who delivered PTLBW. In this study, no correlation was observed between mother's alcohol intake and PTLBW in control group (P>0.05).



Graph No. 16 Distribution According To Tobacco Chewing/Paste Habit of Mother & Birth Weight of baby of Case & Control Group



Birth Weight	Case Group	Control Group			
PTLBW	6 (12.00)	0 (0.00)			
NBW	6 (12.00)	3 (4.00)			
TOTAL	13 (26.00)	3 (6.00)			

Granh No. 15 Distribution According To Alcohol Intake Habit of Mother & Birth Weight of Baby of Case & Control Group

Table No. 14 Distribution According To Tobacco Chewing/Paste Habit of Mother & Birth Weight

Table 14 shows the distribution of cases according to habit of tobacco use in mother (tobacco chew/paste use) and birth weight of baby, in case and control group. Out of 50 mothers of case group, 12 mothers (24%) were using tobacco, whereas in control group, only 3 mothers (6%) were using tobacco. Further evaluation indicated that 12% mothers (6/50) delivered with PTLBW in case group (P<0.05), whereas no case was reported from the control group (P>0.05).

Birth Weight	Case Group	Control Group
PTLBW	1 (2.00)	0 (0.00)
NBW	12 (24.00)	4 (8.00)
TOTAL	13 (26.00)	4 (8.00)

Table No. 15 Distribution According To Smoking Habit of Mother & Birth Weight of Baby of Case & Control Group

Table 15 shows the distribution according to smoking habits of mothers and birth weight of case and control groups. In case group, out of 50 mothers, 13 mothers were smoker whereas in control group, out of 50 mothers there was 4 cases reported as smoker. Out of the 13 smoker mothers of case group only one mother delivered with PTLB and whereas in control group, no case delivered with PTLB.

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Graph No. 17 Distribution According To Smoking Habit of Mother & Birth Weight of Baby of Case & Control Group Discussion

Preterm birth (PTB) and low birth weight (LBW) are the leading perinatal problems worldwide and have evident public health implications, as they are closely related to perinatal mortality and morbidity.¹³

Multiple factors have been reported as a cause of PTB and/or LBW. Out of reported factors some are preventable e.g. alcohol, smoking or drug use during pregnancy, high or low maternal age, low socioeconomic status, maternal infection etc.

A coordinated effort between the oral health and prenatal communities can benefit maternal and child health outcomes. If on-going large and well-designed studies continue to support such results, current practice management for pregnant women will need to be reassessed. Such results should be carefully considered by dental providers, cautioning them not to reject treatment of periodontal diseases with routine prophylaxis and non-surgical periodontal therapy before the 35th week of pregnancy.

In spite of the fact that the child bearing age is from 15 to 45 years, the age group considered for the present study was 18 to 35 years. The rationale selecting the age group between 18 to 35 years is that the periodontal diseases are gram-negative anaerobic infections that can occur in women in the age group of 18 to 34 years. It have been further reported that women of child-bearing age and pregnant women have elevated levels of estrogen and progesterone, which makes them prone for periodontal disease.¹⁴

Age group distribution of mothers in case group and control group has indicated that most of deliveries took place in the age group of 18-30 years. The distribution pattern is almost equal in both control (96%) and case group (84%). Our results are in accordance with the results reported in the literature, which have reported about 80% of deliveries occurs before the age of 30 year.¹⁵

A positive correlation has been reported between mother's educational level and causation of periodontal disease.^{16,17} Literacy of mother is an important parameter for the fetal outcome. This finding is indicated that in case group most of the

mothers 29/50 (58%) were illiterate and out of these 29 illiterate mothers 15 (30%) delivered PTLBW babies (P < 0.05 on Chi-square test). This finding indicated that there is a significant association between education level of mothers and birth weight of baby. Our observations are in accordance with the reported observations by Garvey A, et al.¹⁸

Socio-economic distribution in studied population indicated that in both groups, the maximum number of mother were from SES II (upper middle SE class) but at the same time it was observed that PTLBW deliveries were more in SES IV in case group. This finding was further evaluated and it was observed that in-spite of good Socio-economic Status IV in the case group (who delivered 11(22%) PTLBWs) all of these mothers were illiterate. As reported that positive correlation exists between lower socio-economic status and periodontal disease leading to PTLBW.^{15,16} In this study illiteracy had been found to be more significant factor in comparison to SES as a cause of periodontal disease leading to PTLBW.

In this study, the babies delivered with PTLBW were 6 % (3/50) in the control group mothers with CPI score1or 2 which is comparable with the reported prevalence of 10% of PTLBW in India.^{19,20} whereas in the case group mother with CPI score 3, PTLBW was 36%, which is much higher than the reported in Indian situations (p <0.05). With this observation it is clearly evident that periodontal disease with CPI score 1 and 2 did not contributed to adverse outcome of pregnancy but periodontitis with CPI score 3 have definite role in adverse outcome of pregnancy causing PTLBW babies.

It had reported that periodontal disease causes increased levels of biological fluids that induce labor. Previous research reported that periodontal infection causes a faster-than-normal increase in the levels of prostaglandin and tumor necrosis factor molecules that induce labor. When periodontal disease is present, the number of bacteria significantly increases by as much as 10,000 times the original population. It was further reported that immune system relaxes lightly during pregnancy so as not to harm the foetus and hence more bacteria grow when the immune system is not working in full throttle. The bleeding gums in periodontal disease gives the way to bacteria, who enters in the blood stream, travel through the mother's body, and enter the placenta causing poor fetal growth and as a result PTLBW baby.

Role of other risk factors as a cause of PTLBW was evaluated. The main factors which were evaluated were Hypertension, Tobacco, Smoking and Alcohol in both groups. In case group mothers, it was observed that use of tobacco (smokeless tobaccochewing/ paste) in mothers is playing a major role (12%) in causation of PTLBW, whereas in control group it was not significant. In this study, no other factor was found to play a significant role in causing PTLBW in mothers of both the groups. The term 'smokeless tobacco' is used to describe tobacco that is consumed without heating or burning at the time of use. Smokeless tobacco can be used orally or nasally. The oral use of smokeless tobacco is widely prevalent in India; the different methods of consumption include chewing, sucking and applying tobacco preparations to the teeth and gums.²¹ Other studies also reported a high proportion of low birth weight babies in users of

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smokeless tobacco.²² In this study the data indicated that there is no significant correlation between smoking and PTLBW (P > 0.05) as well as no significant correlation was observed between mother's alcohol intake and PTLBW in control group (P > 0.05).

As the CPI index selected under our study was restricted to score 1 to 3 and the CPI index of 4 or more were exclude. The CAL score expectedly shows the score of zero, rendering the relationship of our study as insignificant. Although CAL does not yield any data on the activity or the presence of periodontal disease, it is the only value that can be compared with other studies, so we used it.

This study indicated a 4.66 fold increase in PTLBW in cases of periodontal infection with CPI score $3 \ge in$ comparison to periodontal infection with CPI score <3. Other workers.^{23,24,25} observed 4.5 to 7 fold increase in incidence of PTLBW in cases with CPI score ≥ 3 . The important observation made in this study was literacy of the mother plays a major role in causation of periodontal disease as well as to PTLBW.



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Summary & Conclusion

Preterm birth (PTB) and low birth weight (LBW) are the leading perinatal problems worldwide. This problem is multifactorial and important since it is closely related to perinatal mortality and morbidity. Out of reported factors some are preventable e.g. alcohol, smoking or drug use during pregnancy, high or low maternal age etc. and some are non preventable e.g. intrauterine maternal infection etc. Recent studies indicated a significant correlation between periodontal infections in mother and PT/LBW babies hence this study was undertaken to establish a cause effect relationship between periodontal disease of mother and PTLBW babies.

In spite of the fact that the child bearing age is from 15 to 45 years, the age group considered for the present study was 18 - 35 years, as the periodontal diseases are gram-negative anaerobic infections are more common in the age group of 18 to 34 years.

In this study, in the control group with CPI score 1 or 2 the babies delivered with PTLBW were 6 %, which is comparable with the reported PTLBW prevalence of 10% in India. Whereas in the case group with CPI score 3, the babies delivered with PTLBW were 36%, which is much higher than the PTLBW reported in Indian situations (p < 0.05). These observations indicated that periodontal disease with CPI score 1 or 2 does not contribute to adverse outcome of pregnancy but periodontitis with CPI score 3 has definite role in adverse outcome of pregnancy causing PTLBW babies.

Most of deliveries took place in the age group of 18-30 years. The distribution pattern of deliveries is almost equal in both control (96%) and case group (84%). Literacy of mother indicated that in case group (periodontal disease with CPI Score= 3), most of the mothers were illiterate (58%) whereas in control group maximum numbers of mother were literate. A positively correlation of periodontal disease and lower education was also observed. In this study a significant positive correlation was also observed between level of education and birth weight of the baby in the group of cases.

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Prevalence of Malocclusion & Orthodontic Treatment Needs Among Dental Students

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Abstract

Need For Study: Actual and self perceived need for orthodontic dental treatment varies significantly. It is important to identify young professionals in actual need of treatment who can be well treated. It is important to note that no large-scale survey on orthodontic treatment needs in children/adults has been conducted in India. This study is an effort to find out the prevalence of malocclusion and orthodontic treatment needs scientifically using Index for Orthodontic Treatment Need (IOTN).

Material & Method: Survey forms, PMT sets, Cheek retractors, Enamel bowls, Kidney trays, PPE kits, Disposable mouth masks, Disposable gloves and Alcohol based antiseptic solution for hand rubbing. Clinical examination of 100 dental students from Inderprastha Dental College was done. The need for orthodontic treatment was assessed using IOTN index and overall oral health status was assessed by DHC index and AC score.

Result: According to the Dental Health Component gradings, 55% of dental students require no treatment, 33% of dental students have Borderline Need of treatment and 12% of the dental students are in Definitive Need of treatment. According to the Aesthetic Component gradings, 85% of the total sample needs no Orthodontic treatment,8% of dental students have borderline need for treatment and 6% of the dental students are in definitive need for Orthodontic Treatment.

Conclusion: A small but significant number of dental students have definite need of orthodontic treatment.

Keywords: Index of Orthodontic Treatment Need, Dental Health Component, Aesthetic Component

Introduction

valuation of self-perceived needs and actual needs for orthodontic treatment and other factors which affects these treatment needs such as personal, psycho-social factors and socio-demographic factors help in planning orthodontic treatment and estimating the required resources as well as manpower.¹ Self perceived need is not always same as actual need as previous studies have shown differences between patients' and professionals' perceptions of orthodontic treatment needs. Also, actual needs as assessed by dental professionals may not be linked to patients' perceptions until and unless the condition has progressed sufficiently to be symptomatic and starts affecting the function.² Few studies have been done to assess the orthodontic treatment need in the population.⁴⁻ It is expected that a cost-effective orthodontic therapy should be target-oriented to address these treatment needs. Thus, the aim of orthodontic treatment should be not only to establish an orofacial system with harmonious interaction of teeth, masticatory musculature, and temporomandibular joints but also to prevent other impairments such as periodontal

lesions, caries, root resorptions, dental trauma, and craniomandibular dysfunction.^{7,8}

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RESEARCH PAPER

Recently, both medical and dental treatments are increasingly and continuously being evaluated under the aspect of economic efficiency and feasibility. Hence, the costbenefit ratio of orthodontic treatment is also being questioned, since the therapeutic result must justify the financial cost of the treatment performed.

Hence, this study was undertaken to find out the prevalence of malocclusion and orthodontic treatment needs among dental students using Index for Orthodontic Treatment Need (IOTN). This study shall help to formulate policies for the future in the training and placement of orthodontists for maximizing the benefits to the needy.

Aim of the Study

To estimate the prevalence of malocclusion and ascertain the orthodontic treatment need using the Index for Orthodontic Treatment Need (IOTN) among dental students and to evaluate any relation between increased score of DHC index and AC score in the existing orthodontic problems.

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Materials & Methodology

The study was conducted at Inderprastha dental college, Sahibabad on 100 dental students.

Inclusion criteria: -

- (i) Permanent dentition with no missing teeth except third molar.
- (ii) No major local/systemic problems or trauma which affects the growth and development of facial structures or body.
- (iii) No previous history of orthodontic treatment.

Materials used were Survey forms, PMT sets, Cheek retractors, Enamel bowls, Kidney trays, PPE kits, Disposable mouth masks, Disposable gloves and Alcohol based antiseptic solution for hand rubbing.

The Dental Health Component (DHC)



Figure 1: Dental Health Component Index

The data recorded was subjected to chi square statistical analysis.

Results

DHC scores (Table1, Figure 3) obtained from examining the sample population of 100 Dental students showed that Grades 1 and 2 were found in 55% of the dental students, grade 3 among 33% and Grade 4 or 5 among 12% of the dental students.

(Table 2, Figure 4) represents the comparison of Aesthetic component among the students examined. Grade 1-4 were found in 85% of the dental students, grade 5-7 among 9% and Grade 8-

Table 1: Treatmen	nt Need Accord	ing To Dental	Health C	Component
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DHC grade	Need for treatment	Total Percent of Students
Grade 1 and 2	No treatment	55%
Grade 3	Borderline	33%
Grade 4 and 5	Definitive treatment	12%

Chi square 200.0, p=0.000



All survey forms were duly filled by the orthodontist along with the questionnaire to assess the attitude of the patient towards dental treatment.

- (i) Patients were examined for Missing teeth, Overjet, Crossbites, Displacement of contact points and Overbites. The patients were categorized according to the most severe trait, with a score ranging therefore from 1 to5. The Aesthetic component was graded on scale of 1 10.
- (ii) The need for orthodontic treatment and overall oral health status was assessed by DHC score Index (Figure 1) and AC score Index (Figure 2).

AESTHETIC COMPONENT



Figure 2: Aesthetic Component Index

10 among 6% of the dental students.

Chi square test on DHC and AC scores (Table 3, Table 4) sowed that there was no significant difference in the treatment need among males and females(p=0.145 in DHC andp=0.607 in AC).

Chi square test on DHC and AC scores (Table 3, Table 4) sowed that there was no significant difference in the treatment need among males and females (p=0.145 in DHC and p=0.607 in AC).

Figure 3: Dental Health component Score Bar Graph



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Table 2: Treatment	Need According To	Aesthetic Component
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AC grade	Need for treatment	Total Percent of Students
Grade 1-4	No treatment	85%
Grade 5-7	Borderline	09%
Grade 8-10	Definitive treatment	06%

Chi square 200.0, p=0.000

Table 3: Dental Health Component Among Males and Females

DHC grade	Male	Female	Chi square Value	p-value
Grade 1 and 2	66.6%	50%		
Grade 3	30%	34.3%	3.860	0.145
Grade 4 and 5	3.4%	15.7%		

Discussion

The present study showed that, no treatment need was found in majority of students ie 55% of students, while 33% students had borderline needs and definitive treatment need was seen among 12% of students. Similar results were seen in the study done byAlhummayani FM and Taibah SM (2018), who found no treatment need was seen in majority of sample examined (54.3%), borderline treatment need in 21.4% and definitive treatment need was seen in 24.3% of the sample.

Also, similar results were found by Kumar Pet al¹⁰with aesthetic component showing no treatment need in maximum people examined. examined (73.6%), borderline among 16.9% and definite treatment need in 9.5% people.

On the other hand, Cardoso CF et al¹¹found definite treatment need in maximum number of patients in Dental Health Component (72%) and in Aesthetic Component patients (61%) and no treatment need in minimum number of patients in DHC (9%) and AC (11%).

There was no significant difference in the orthodontic treatment needs among male and females. The result of the present study was found to be contradictory to the study done by Aikins EA et al¹² found that males required definite treatment need significantly more than females when they screened 612 Nigerian school children. This discrepancy may be due to difference in race and ethnicity.

Conclusion

✓ According to the Dental Health Component gradings, the data showed that more than 55% of dental students require no treatment, 33% of dental students are in Borderline Need of treatment and 12% of the dental students are in definitive need of treatment.

Table 4: Aesthetic Component Among Males And Females					
AC grade	Male	Female	Chi square Value	p-value	
Grade 1-4	96.6%	91.4%	0.998	0.607	
Grade 5-7	3.33%	16.6%			
Grade 8-10	0.(0%)	3.33%			

Table 4: Aesthetic Component Among Males And Female

✓ According to the Aesthetic Component gradings, 85% of the total sample needs no Orthodontic treatment. Also, 9% of dental students require the borderline need for treatment and 6% of the dental students are in definitive need for Orthodontic Treatment.

The study helped us to identify young professionals in need of treatment who can be well treated under the guidance of college authorities and efficient orthodontists. The present study was conducted in a limited population. More surveys and studies similar to this study should be encouraged by the government and institutions with a larger population to have a better understanding of the orthodontic treatment needs amongst population.

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Clinical Evaluation of Efficiency, Acceptance & Preference Between Needless Jet Injecter Anesthesia (MADAJET XL) & Classical Needle Infiltration For Dental Procedures in Pediatric Patients

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Abstract

Objectives: To evaluate and compare pain perception during administration of anaesthetic solution, effectiveness and preference between needle-less jet injector and conventional infiltration technique in children.

Materials & Methods: Sixty-five patients with mean age of 8.33 years (SD 1.58, range 6-12) were anaesthetized by needle-less jet injector and conventional needle infiltration technique in two separate appointments for invasive/noninvasive dental procedures. Pain during administration and during treatment was evaluated by Likert and Wong Baker Faces Pain Rating scale. Patients gave their preference between two anaesthetic techniques for next course of treatment in third visit. Effectiveness of each anaesthetic technique was assessed by evaluating presence and absence of pain while probing gingivae, during use of high and low speed handpiece, during extraction and pulp extirpation.

Results: Pain perception during administration of anaesthesia was significantly less by needleless jet injector than conventional infiltration technique (P < 0.05) and there was no significant difference in effectiveness during treatment procedures (p > 0.05). Postoperative complications viz. bleeding and bad taste during administration of anaesthetic solution was higher for jet injector (60% and 33.84% respectively) than conventional infiltration (21.53% & 12.31%). A total 81.5% of subjects preferred jet injectors over conventional infiltration technique.

Conclusion: Needle-less jet injector was perceived to be significantly less painful and preferred means of anaesthetic drug administration over conventional needle infiltration. It provided adequate anaesthesia in maxillary and mandibular teeth during all the procedures, but it was less effective in mandibular molars for invasive procedures. Thus it is suggested that needle-less jet injector can be used as supplementary to conventional infiltration technique.

Keywords: Local anaesthesia, needle-less local anaesthesia, jet injector, local infiltration, Pediatric dental patients.



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Introduction

ain is one of the most commonly experienced and vaguely described emotions during dental treatment. A child experiencing pain exhibits higher resistance to treatment due to which behavior guidance becomes a major concern. This renders it important; to reduce the pain and discomfort to minimum at each dental visit. The most widely used method for pain control is to block pathway of pain impulses by depositing anaesthetic agent in proximity to nerve. Various methods and techniques have been developed over the years, to deposit anesthetic solution in desired anatomical area; most common in practice is, needle connected to a syringe since several decades.

Various epidemiological studies have revealed that dental fear is prevalent at all age groups and genders worldwide.^[1],12]One of the primary identified reasons is fear of injections, which most pediatric patients exhibit during treatment. Hence it is a challenge for the Pediatric dentist to deliver painless dental care and at the same time instill positive attitude in the child towards dentistry.

A step in this direction is application of techniques by which the anaesthetic solution is introduced into the tissue without use of needle. Recently the needle-less jet injectors have proved to be a valuable asset to the armamentarium of Pediatric dentists. It forces a high-velocity spray of anesthetic solution under high pressure into oral mucosa and infiltrates the tissue in tiny droplet form, which is immediately taken up by myelin sheath of the nerve.

John F. Roberts introduced the jet injection syringe in (1933).^[3] It was popularized in clinical use in 1947, since then it has been used

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in various medical procedures like for insulin delivery, regional and digital blocks, incision of abscess, vasectomy, cryosurgery aspiration biopsy of lymph nodes, repair of laceration, curettage and cyst excision.^[4] In 1973, Santangelo, Mott and Stevenson reported that 83% leukemic patients preferred jet injectors over conventional needle for anesthesia during lumbar puncture and bone marrow aspiration.^[5] Although Jet injector has attracted a number of dental practitioners since last five decades,^[6] the current opinion advocates its use only for surface anesthesia, supplementary to the standard infiltration technique.^[7] Therefore; the present study compares pain perception during administration of anaesthetic solution and effectiveness, using the needleless injector and conventional technique in children.

Materials & Methods

Subjects were selected from outpatient department of Pedodontics and Preventive dentistry. It was a prospective study with split mouth design in which 65 subjects aged between 6-12 years of both the genders were included after gaining approval from the Institutional Ethical Committee. A thorough medical history was obtained. The entire procedure with all the possible complications were explained to parents and a prior written informed parental consent was obtained before any procedure.

Healthy subjects having at least two primary teeth, one in each contra lateral side of mouth in same dental archreceptive to similar dental procedures. Children showing positive/definitely positive behavior according to Frankl's behavior rating scale were included in the study.Fearful subjects, negative and definitely negative, previous experience of dental injections, primary teeth with periapical pathology and permanent teeth were excluded from the study.

Extraction (grade-I, II mobility and root stumps), pulp therapy and restoration (class I, II) were performed during the course of study. Selection of arch side to receive an infiltration by jet injector or needle infiltration and visit was done randomly for each subject. Before commencement of any procedure, the device (Madajet XL)(**Fig 1**) was shown to the subject and the popping sound that is generated during use of the injector was



Figure 1: Needle-less Jet injector (Madajet XL)

demonstrated. Each injection of Madajet XL delivers a volume of anesthetic solution 1/10 of an ml. For buccal and lingual/ palatal infiltration total 0.4 ml of 2% lignocaine HCl, with 1:80,000 epinephrine was used as injectable anaesthetic solution by conventional needle (24 gauze) (0.3 ml solution on buccal and 0.1 ml on lingual/palatal side) and by needle-less injector (three simultaneous shots on buccal and two on lingual/palatal side) (**Fig 2**). Before administration of local anaesthesia, topical anaesthetic agent lidocaine 15% was applied over the mucosa.

All procedures and assessments were done by single operator. In both appointments pain perception during administration of anaesthesia and effectiveness in controlling pain was evaluated by two pain rating scales;

a) Wong Baker faces pain rating scale^[8]: (unidirectional self-reported pain rating scale)



It comprises of 6 faces of different expressions, representing different levels of pain. The child was asked to choose the face that best describes his/ her own pain.

a) Likert scale^[1]: (operator based scale of pain assessment) It is a unidimensional 5 point scale grounded on the intimate understanding of the subject matter. Assessment by clinician was based on facial expressions, physical response (bodily movement) and on the verbal complaints made by the subjects in reaction to both techniques used.

Score Criteria

- l Hurt worst
- Hurt even more
 Hurt little more
- 4 Hurt little
- 4 Hurt little5 No hurt



Figure 2: A-Buccal infiltration by needle-less jet injector B-Palatal infiltration by needle-less jet injector C-Buccal infiltration by conventional technique D- Palatal infiltration by conventional technique

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Score 1 (Hurt worst) - Was assigned, when the patient's response to effectiveness of anesthesia was negative, accompanied with extreme agitation, flaying of extremities, moving the head and crying.

Score 2 (Hurt even more) -Was assigned, when the patients showed orofacial muscle contractions expressing pain, and did not allow the treatment to be done. Some patients verbally conveyed pain by crying

Score 3 (Hurt little more)-Was assigned, when the patients got the treatment done although with constant whining.

Score 4 (Hurt little) - Was assigned when the patients shows occasional instances of slight discomfort.

Score 5 (No hurt) - Was assigned when the patients showing no indication of pain or discomfort.

Any complication (bleeding, bad taste) during administration of anaesthesia was also recorded. The subjects were asked to give their preference for anaesthetic techniques (needle–less jet injector/conventional method) on third appointment. The interval of time between appointments was dependent upon type of treatment but was not more than 3-4 days.

Data were analyzed using the SPSS 16.0 edition software. Paired t-test was performed to compare pain during administration of anaesthetic solution using needle-less jet injector/conventional needle infiltration and during treatment.

Results

The sample consisted of 65 subjects including both genders, out of which 39 (60%) were males and 26 (40%) were females. Subjects were aged between 6-12 years (mean age 8.33 ± 1.58). Extractions (41.5%) were performed in maximum subjects followed by restorations (36.9%), and pulpectomies in (21.5%) subjects.

(I) Distribution of subjects according to preference of anaesthetic technique 81.5% preferred needle-less jet injector over conventional infiltration technique of anaesthesia for next course of treatment.

A. Age-wise preference

Preference for needle-less jet injector was highest among 8-9 years of age group, 85.7% subjects preferred needle-less jet injector over conventional infiltration technique. 80.9% preferred needle-less jet injector in 6-7 year age group and 75% preferred needle-less jet injector in ≥ 10 year age group. There were no statistically significant (p=0.62) association found between age and preference of anaesthetic technique.(Table-1)

B. Gender-wise preference

82.1% of females preferred needle-less jet injector than males (81.1%), but statisticallyno significant (p=0.91) association was found between gender and preference for anaesthetic techniques. (Table-1)

Age in years	No. (n=65)	Male	Female
6-7	21, (32.3%)	17	4
8-9	28, (43.1%)	14	14
<u>≥</u> 10	16, (24.6%)	6	10
Mean±SD (8.33±1.58)		37 (60%)	28 (40%)

Table 1: Age and gender-wise distribution of subjects

(II) Comparative evaluation of pain perception during administration of anaesthesia

A statistically significant (p=0.0001) difference was found in pain perception during administration of anesthesia between needle-less jet injector and conventional needle infiltration by both Likert scale and Wong Baker faces pain rating scale. Needleless jet injector was significantly less painful than conventional needle infiltration.(Table-2)

Type of scale Needle-less jet injector (Mean±SD)		Conventional infiltration technique (Mean±SD)	p-value ¹
Likert scale	4.22±0.69	2.48±0.94	0.0001*
Wong Baker scale	1.32±0.74	2.98±1.25	0.0001*

¹Paired t-test, *Significant

Table 2: Comparative evaluation of pain perception between needle-less jet injector

 & conventional infiltration technique during administration of anesthesia.

(III) Comparative evaluation of effectiveness of needle-less jet injector and conventional needle infiltration

Our assessment of pain (Likert scale) was higher in subjects anaesthetized by conventional infiltration technique than in needle-less jet injector but it was not statistically significant (p=0.60

Patients' perception of pain in Wong Baker faces pain rating scale was higher in needle-less jet injector than conventional infiltration technique during treatment but it was not statistically significant (p=0.48)(Table-3).

Type of scale	ype of scale Needle-less jet injector (Mean±SD)		p-value ¹
Likert scale	4.22±0.99	4.17±0.90	0.60
Wong Baker scale	1.42±1.03	1.33±0.89	0.48

Paired t-test

 Table 3 : Comparative evaluation of effectiveness between needle-less jet injector & conventional infiltration technique during treatment.

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(IV) Comparative evaluation of effectiveness of anaesthesia delivered by needle-less jet injector and conventional infiltration technique during various procedures of primary anterior and posterior teeth including both the arches:

a. Extractions

Bilateral extractions were performed in 27 (41.5%) subjects out of which 12 (44.4%) pairs of teeth were anterior and 15 (55.5%) were posterior including both arches. 25 (92.59%) pairs of teeth were successfully extracted but during extraction of 2 (7.41%) mandibular root stumps profound anaesthesia was not accomplished by needle-less jet injector.

Pain assessed by operator (Likert scale) and pain perceived by patient (Wong Baker Faces Pain Rating Scale)during extraction, was more in needle-less jet injector than conventional infiltration technique but the difference was not statistically significant.(Table-4)

b. Restoration

Restorations were successfully completed in all 24 (36.9%) subjects bilaterally, out of which 9 (37.5%) were done on anteriors and 15 (62.5%) on posteriors. Pain assessed by operator (Likert scale) during restoration was more for conventional infiltration technique, but the difference was not statistically significant (p=0.32). Pain perceived by patient (Wong Baker faces pain rating scale) during restoration was more in needle-less jet injector, but the difference was not statistically significant (p=0.46). (Table-4)

Treatment modality/ Type of scale	Needle-less jet injector (Mean±SD)	Conventional infiltration technique (Mean±SD)	p-value ¹	Failure rate
Extraction				2 (7.41%)
Likert scale	3.72±1.06	3.80±1.11	0.60	
Wong Baker scale	1.76±1.05	1.60±1.04	0.46	
Restoration				0
Likert scale	4.38±0.64	4.33±0.63	0.32	
Wong Baker scale	1.08±0.83	1.17±0.76	0.16	
Pulp therapy				3 (21.42%)
Likert scale	4.45±1.21	4.64±0.50	0.65	
Wong Baker scale	1.36±1.20	1.09±0.70	0.53	

¹Paired t-test

 Table 4: Comparative evaluation of effectiveness of anaesthesia delivered by needleless jet injector & conventional infiltration technique during various procedures.

c. Pulpectomies

Pulpectomies were performed in 14 (21.5%) subjects bilaterally, out of which 3(21.4%) were done on anterior teeth and 11 (78.5%) in posterior teeth including both arches. However profound anaesthesia was not achieved in 3 mandibular molars which were additionally anaesthetized by conventional

infiltration technique. Thus comparison of effectiveness for pulpectomy was presented for 11 subjects. There was no statistically significant difference in Likert scale (p=0.65) and Wong Baker faces pain rating scale (p=0.53) during pulp therapy between conventional infiltration technique and needle-less jet injector.(Table-4)

(V) Success rate of anaesthesia by needle-less jet injector and conventional infiltration technique

Conventional infiltration technique provided profound anaesthesia during all procedures in all subjects (success rate 100%). Whereas success rate of needle-less jet injector was found to be 92.30% as 5 subjects required additional anaesthesia by conventional infiltration technique to complete the procedure. (Table-5)

Type of anaesthetic method	Success rate	Failure rate
Needle-less jet injector	92.30%	7.69%
Conventional infiltration technique	100%	0%

 Table 5: Comparative evaluation of success rates(
 Successful anesthesia)
 Between needle-less jet injector and conventional method.

(VI) Complications of needle-less jet injector and conventional needle infiltration during administration of anaesthetic solution

Bleeding from oral mucosa with needle-less jet injector was found in 60% subjects and 21.53% with conventional infiltration anesthesia. Bad taste was reported by 33.84% subjects with needle-less jet injector and 12.31% by conventional infiltration technique. The incidence of bleeding and bad taste were associated more with needle-less jet injector but the difference in complications using both the techniques, was not statistically significant (p=0.18)(Table 6)

	Needle-less jet injector (n=65)		Conventional (n=65)	
Type of Complications*	No.	%	No.	%
Bleeding	39	60%	14	21.53%
Bad taste	22	33.84%	8	12.31%
Total	41	63.08%	18	27.69%

 Table 6: Distribution of type of complications during administration of anaesthetic solution



Discussion

Pain control is one of the most important aspects of paediatric dentistry; and local anesthesia remains backbone of pain control in dentistry. Children are often distressed by mere sight of needle than by ensuing dental treatment. Every pediatric dentist's ultimate goal is a happy child walking out of the operatory with a positive dental attitude even after an invasive procedure. Pain during administration of anaesthesia possibly owes to tissue damage caused by needle penetration and pressure of anaesthetic solution into the tissue.^[9] It has been suggested that finer the needle and slower the delivery of anaesthetic solution, lesser is the pain caused.^[10] A necessity to eliminate needle-phobia was intensely felt by researchers, and research aiming towards this goal commenced and rested in 1947, when Hingson et al ^[6]used needle-less delivery system, Since jet injector devices use a small volume of anaesthetic solution (0.1 ml) in each shot, it produces less tissue expansion (Aberge et al 1978),^[11] and gradual reduction in pressure causes deposition of the solution in layers, with initial deposition occurring in deeper layer which is less painful followed by deposition in superficial layer (Margetis et al 1985)^[12] and (Bennett et al 1971).^[13]

The present study was aimed to assess the effectiveness of anaesthesia and pain during treatment by using both, subject and clinician based pain rating scales. The difference between pain perception by patient and operator was non-significant, suggesting similar efficacy for both techniques (Table-2).^{[1],[1],[1],[1],[1],[1]} Oulis et al (1996)^[15] and yonchak et al (2001)^[16] have explained that the anaesthetic solution diffuses through the cortical plates in both jaw bones and anesthetizes the pulpal nerves up to equal depth by both methods.

In the present study, infiltration by conventional technique provided adequate anaesthesia during all procedures (restorations, extractions and pulpectomies) with 100% success. However, needle-less jet injector failed to provide adequate anaesthesia in 5 subjects (7.69%), thus additional anaesthesia was administered through convent ional needle infiltration technique to complete the procedure. All the failures were associated with mandibular molars during pulp tissue management and extractions, whereas restorations were successfully performed in all the subjects (Table-4).

Saravia et al (1991)^[14] found success rate as high as 80%, while Munshi et al (2001)^[1] and Makade et al (2014)^[7] observed that total success rates for effectiveness of anesthesia using Madajet according to patient and clinician was 98% and 100% respectively. Conflicting results were reported by Arapostathis et al (2010),^[17] they found that 70 of 87 (80.5%) cases required additional anaesthesia. Oulis et al (1996)^[15] and Yonchak et al (2001)^[16] explained that cortical plate of maxillary bone is more porous than mandible, thus diffusion of anaesthetic solution is questionable in mandibular posterior region. Meechan et al (2011)^[18] stated that there are holes present in the body of the mandible like mental foramen and multiple minor perforations, which could permit diffusion of solution into cancellous space. These multiple minor perforations are present especially on lingual aspect of mandibular anterior, this could possibly explain successful completion of all the procedures in anterior mandibular by needle less jet injector infiltration and higher percentage of failure in mandibular posterior region. Arapostathis et al (2010)^[17] found higher percentage of failure in their study as it was based on adult mandible which is less porous due to mineralization of the bone with age.

In present study, bleeding from oral mucosa and bad taste due to leakage of anaesthetic solution into oral cavity was significantly higher with needle-less jet injector (60% and 33.84% respectively) than conventional needle infiltration (21.53% and 12.31% respectively). According to Makade et al(2014)^[7] and Arapostathis et al (2010)^[17], significantly more bleeding from mucosa at the injection site was noted with jet injector (Madajet and Injex respectively) than conventional infiltration technique. However, Makade et al (2014)^[7] reported no significant difference in bad taste with both the techniques. Our findings were in contrast to Dabrakis et al (2007)^[3] theyreported limited bleeding at the injection site in 14.6% of patients. Margetis et al (1958)^[12] suggested that bleeding from mucosa immediately after anesthesia was due to extremely fast delivery of anaesthetic solution through jet injectors and leakage of anaesthetic solution due to improper positioning of head assembly accounted for bad taste. Hence in our study jet injector was firmly placed over mucosa during infiltration of anaesthetic solution although it was difficult to achieve because of scalloped bone adjacent to root apices, thus we were not able to eliminate this complication entirely.

The subjects were recalled to give their preferences for anaesthetic techniques (needle–less jet injector/conventional infiltration technique) on third appointment. 81.5% subjects preferred needle-less jet injector over conventional needle infiltration. This might be due to less threatening appearance of needle-less jet injector, significantly less pain was perceived by the subjects during anaesthetic administration as compared to conventional infiltration technique. Our findings were in agreement with Saravia et al (1991)^[14] they found 75% patients' preferred for needle-less jet injector. Munshi et al (2001)^[1] reported 93% patients' acceptance for pressure anesthesia.

The results (pain perception & effectiveness) of the present study were antagonistic to the study by Arapostathis et al $(2010)^{[17]}$; they reported negative experiences with jet injector as 73% children preferred the conventional infiltration technique. Similarly, Dabarakis et al $(2007)^{[3]}$ in their study found that only 17.6% patients preferred jet injector; whereas 52.8% preferred classical injection technique. In both the studies, authors reported higher incidence of failure rate with needle-less jet injector (Injex) and pain during treatment was found to be higher with Injex. It is possible that some children might have bad experience with jet injectors, which might influence their responses to the needleless devices (Injex). The anaesthetic device used in their study was Injex, in which the anaesthetic delivering segment forms a 90° angle with the main body contrary to Madajet.^[11,17]

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producing better and easy positioning with complete contact with gingiva creating less pressure during administration resulting in less leakage and less bad taste compared to other pressure anaesthetic.^[7]

Based on the findings of present study, age and gender werenot significantly related to preference of anaesthetic technique. This was in accordance with Schmidt et al $(1966)^{[19]}$ and Arapostathis et al (2010),^[17] they also observed no age difference in preferences. Saravia et al $(1991)^{[14]}$ and Araposta thiset al $(2010)^{[17]}$ also reported no gender differences for preference. In present study 18.4% of children preferred conventional needle infiltration over jet injector, which was higher in older age group children (preference was 25% in \geq 10-year age group). This might be due to anxiety on introduction of a new technique and the distressing popping sound that comes with activation of needleless injector. Majstorovic et al $(2004)^{[20]}$ also found that needle phobia progressively decreases with increasing age.

Needle-less jet injectors can be a valuable tool in managing needle phobic children in order to provide effective and efficient treatment and instill a positive dental attitude for future. The present study may help in establishing role of needle-less jet injector in managing fearful & anxious paediatric population. However, further investigations with larger sample size are recommended to assess effectiveness in mandibular molars.

Conclusions

Needle–less jet injector was found to be less painful during administration of anaesthesia than conventional needle infiltration in our study. It effectively anaesthetized mandibular anteriors and maxillary teeth for all the procedures and was less effective for invasive procedures like pulpectomy and extractions for mandibular molars. Needle-less jet injectors can be a valuable tool in managing needle phobic children and instills a positive dental attitude for future.

The perpetuation of conventional techniques of LA administration needs to be reconsidered and modified to enhance the quality of care provided in the modern era of dentistry. The present study may help in establishing role of needle-less jet injector in managing fearful & anxious paediatric dental population.

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Transverse Maxillary Deficiency Correction Using MARPE

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Abstract

Maxillary transverse insufficiency is one of the most common causes of orthodontic treatment failure. There are a variety of therapeutic options available to address this issue. Rapid maxillary expansion (RME) and miniscrew/surgical assisted rapid palatal expansion (MARPE/SARPE) are the most popular treatment options. Traditional orthodontic appliances can be manufactured with greater precision using 3D printing and computer-aided manufacturing (CAD-CAM). Three pillars support CAD-CAM technology: Digital image acquisition of patients' dental arches, visualisation and manipulation of these images in specific software, and 3D-printing files. In the article we have discussed about a case of transverse maxillary deficiency treated with MARPE using CAD-CAM technology.

Introduction

ransverse maxillary deficit is a moderately common orthodontic condition in adults, with a prevalence of about 10%.1 According to previous study, roughly 18% of patients having mixed-dentition exhibit a maxillary constrictions transverse.² It is generally characterised by a unilateral or bilateral posterior crossbite. The discrepancy between both the maxillary and mandibular arches is linked to crowding, increased vertical alveolar growth, vast buccal corridors, teeth attrition, periodontal disease, as well as facial muscle imbalance. A correct transverse skeletal relationship is essential for achieving a stable occlusion and avoiding these negative consequences.3

Rapid palatal expansion (RPE) procedures have both orthopaedic and dental effects to rectify the skeletal discordance⁴. RPE appliances come in a variety of shapes and sizes, with varying expansion rates, but the basics remain the same. The midpalatal suture is ruptured and separated when a quick transverse force is applied to the maxillary teeth, resulting in enhanced cellular activity and bone remodelling.⁵ RPE is best performed before the age of 15. With age, the midpalatal suture and neighbouring articulations fuse and become more rigid, resulting in enhanced resistance to expansion⁶

Alveolar bone bending and tooth tipping are unavoidable with traditional RPE appliances because the expansion pressures are transmitted through the teeth by design. Such movements not only use a large amount of the device's overall activation, decreasing total skeletal expansion, but also cause rotation of the jaw clockwise and bite opening.⁶

The application of orthopaedic forces or surgical intervention is required to achieve expansion of the restricted maxillary arch. Patients with little or no residual growth are typically hesitant to have surgery, leading to attempts to address these defects without undergoing surgery, which led to the creation of MARPE. Lee et al. (2010) pioneered miniscrew-assisted RPE (MARPE). Miniscrews were held in place with attachments welded to the expansion screw.⁷

Dr. Won Moon et al developed the MARPE appliance, which is a unique adaptation of the RME appliance that has become a breakthrough in transverse malocclusion correction. It has shown to be a feasible and effective nonsurgical treatment for young people since its inception.⁸

This case study shows an adult's successful orthopaedic correction prior to fixed orthodontic treatment. A unique MARPE design and expansion strategy was used to eliminate the transverse skeletal disparity.

In the world of orthodontics, there is now a lot of discussion regarding what the optimum MARPE design is, how to achieve the best skeletal outcome, if bespoke MARPE is the way to go, or whether prefabricated ones are sufficient in all clinical circumstances. Traditional appliances such as hyrax, lingual, and transpalatal arches are routinely fabricated using conventional laboratory techniques, despite the fact that 3D technology can be utilised to achieve higher precision in their output.



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Digital Streamlines for Customized 3D Digital MARPE Construction.⁹



Step 1: Intraoral scanning -Figure2(a)

Step 2: After cleaning the image and creating a digital basis, a Digital Kesling setup is used to segment individual teeth.-Figure2(b)

Step 3: For the maxilla, CBCT is performed, and the files are transformed to STL for improved superimposition. -Figure 2(c)

Step 4: These data are then placed on intraoral scans to serve as a reference for temporary anchoring device (TAD) placements, ensuring that no root contact occurs. -Figure 2(d)

Step 5: Digitally put expansion hyrax scans in the palate and the final digital models are examined for clearance from the roots of the anterior teeth, as well as distance and adaption to the palate. After that, they're exported in STL format (without the TADs' digital data) for direct metal laser sintering. -Figure 2(e)

Step 7:-After metal printing, the appliance is electropolished and hyrax is laser-welded in place. -Figure 2(f)

Step 8: Finally, the appliance is cemented. After cementation, TADS are implanted, and expansion can begin according to the patient's needs.

This case study shows an adult's successful orthopaedic correction prior to fixed orthodontic treatment. A unique MARPE design and expansion strategy was used to eliminate the transverse skeletal disparity

Diagnosis & Etiology

A patient with initials P.S reported to the Dept Of Orthodontics & Dentofacial Orthopedics Manav Rachna Dental College Faridabad Haryana, for consultation and screening (Figure 3a, 3b and 3c). Patients chief complaint was "I have crowding in the front, and I am not happy with the arrangement of my teeth." Clinical examination revealed 3mm of arch width disparity, as well as a 3 mm shift in mandibular dental midline to the left. Total crowding of 7 mm in the maxillary arch and 11 mm in the mandibular arch. The patient had already undergone a number of orthodontic consultations and was specific on avoiding any type of orthognathic surgery. There has been no family history of skeletal growth pattern Class II.

Intra-oral Photographs



Figure 3 a: Pre MARPE intraoral pictures



Figure 3 b . PA CEPH

Figure 3 c . Lateral CEPH

Treatment Objectives

A skeletal imbalance induced dental compensation in the patient. The orthopaedic correction of the posterior crossbite was the first goal of orthodontic treatment, followed by fixed orthodontic treatment, because with such a skeletal situation, a harmonious occlusion couldn't have been accomplished. The expansion phase of this treatment should aim for an increase of around 10 mm in the breadth of the basal structures, based on the amount of arch width disparity seen at the first molars.

In this case study, we focus on the effects of the treatment expansion phase in order to emphasise the value of the MARPE procedure.

Treatment Progress

The MARPE expander came with four microimplants (2 * 12 mm) put into the appliance's 2 * 12 mm slots. The insertion slots ensure a precise fit and secure perpendicular position for the



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microimplants. The 12-mm length was calculated using a 2-mm insertion slot heightA minimal level of 5 to 6 mm of bone involvement and 1-2 mm of space between both the appliance as well as the palatal surface. This was done to establish a bicortical link between the microimplants as well as the palate. The maximum screw size that'd fit in the palatal vault while also still making sure tight adaptation of a appliance toward the tissue surface between both the maxillary first molars determined the dimensions of the jackscrew. The lateral forces exerted on the pterygomaxillary buttress bone, which is a key obstacle to maxillary growth, were chosen for this position.

The pace of expansion was chosen based on the procedure that had been devised, through clinical experience of Dr. Won Moon The MARPE appliance was adopted by the orthodontic community. The activation began with two turns daily till a diastema occurred; after that, the activation was increased to four turns per day. The maxillary first molars got 11 mm of expansion after 10 mm of MARPE growth as well as molar uprighting., and the maxillary canines got 10 mm of expansion (Figure 4a and b). On the day when the expansion was completed, a progress conebeam computed tomography(CBCT) image was taken



Figure 4a- 10 mm of expansion -Figure 4b

Treatment Results

The top craniofacial components, including the maxillary basal bone, were considerably expanded after the expansion, resulting in the total eradication of the crossbite. Preoperative as well as postoperative 2d radiographs revealed the documented expansion changes as well as 3-dimensional CBCT images. The measurements reveal a reasonably consistent increase in the width of the upper maxillofacial components such as the zygoma and nasal bone, as well as the alveolar area. Buccolingual angulation increased little in the first molars and premolars.

Discussion

RPE appliances of several varieties, including hyrax and Haas Expanders which are the most commonly available.¹⁰ Despite the fact that the evidence frequently supports the use of RPE in children and adolescents, patient palatal expansion in patients who are not growing Because of maturing, has been demonstrated to be less successful. The midpalatal suture as well as its surrounding articulations are more mechanically resistant. This is related to the previous point. Traditional tooth anchoring does have a number of well-documented disadvantages, which would include post-expansion appliance tipping, root resorption, as well as post-expansion relapse.¹⁰

Skeletal & Dental Effects

Total expansion refers to skeletal (orthopaedic) but also dentoalveolar (orthodontic) expansion, that also includes alveolar putent bone bending but also dental tipping. The centre of rotation of the maxilla in traditional hybrid bone-borne RPE appliances is substantially higher than the miniscrew implantation point, resulting in torque creation in two maxillae and alveolar bone bending.¹⁰

Dental tipping was seen due to alveolar bone bending, even if the relative position of attached teeth did not alter. With less dental tilting, a more lateral translation of the complex could be obtained by exerting expansion forces closer to the maxilla's centre of resistance. Because the pterygomaxillary complex provides the most resistance to sutural opening, the MARPE body should be positioned towards the hard-soft palate intersection¹⁰. W h e n forces are applied to the maxilla's centre of resistance through appropriate microimplant positioning with customised MARPE appliances, inclined forces are effectively eliminated due to homogeneous force dissipation on the posterior teeth, allowing for more parallel midpalatalsutural opening coronally. Pterygoid plate separation with MARPE results in a parallel growth, whereas SARPE results in a "V" expansion due to the lack of pterygoid plate separation at the mid-palatal suture..¹¹

Because their pterygomaxillary and zygomaticomaxillary sutures are not fully formed, children and adolescents have reduced bony barrier to maxillary expansion. Adult patients will face a significant amount of orthopaedic force on the anchor teeth as a result of the increased bony resistance, leading in dental tilting and alveolar bone bending.

The zygomatic bone has shifted forward and to the side. The forward displacement is minor overall, whereas the lateral displacement begins near the zygomatico maxillary suture and gradually diminishes towards the temporal process of the zygomatic bone (zygomatic arch) and finally to the frontozygomatic suture.

Overall, the zygoma rotates with both the zygomatico maxillary complex, with the frontozygomatic suture serving as the fulcrum. According to Cantarella et al¹², there may be almost no displacement visible above the frontozygomatic suture, as well as the possibility of asymmetric expansion due to differences in densities and morphology of bones, particularly the zygomatic buttress and pyramidal process, which are not always identical on both sides.¹³

Advantages of MARPE

In comparison to conventional expansion, that also takes 2-6 months, the treatment period is rather short, varying from one to four weeks of active expansion. Because of the MARPE independence of any anchor tooth units, fixed orthodontic therapy and removable orthodontic appliances can be employed together.

You'll also be able to expand your business as a bonus. It is feasible to achieve maximum bone displacement while minimising the consequences of dental tilting. In contrast to standard expansion procedures, the back teeth are not as pointed buccally following therapy because the maxillary is more stable.

Limitations of MARPE

When force is exerted from a greater distance towards the bone as well as implant interface, MI deformation is more likely.¹¹

When MSE is placed on a narrow high arched palate, the chances of treatment success are reduced.

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MARPE failure is caused by unpredictable variability in the pattern of MPS calcification and craniofacial morphology (increased resistance).

The use of missing or compromised anchor units in traditional MARPE deployment is an impediment.

MARPE causing dizziness and tension across the bridge of the nose, eyes, and generally throughout the face by distributing stress around the anchor teeth and zygomaticomaxillary process extending along the external wall of the orbit. Patients with the severe sutural interdigitation and little bone density must therefore turn to medically aided expansion.

Conclusion

This case report shows how a unique MARPE design and expansion technique was used to successfully treat an adult patient with a restricted maxilla. The MARPE treatment resulted in growth of maxilla and adjacent craniofacial components with splitting the midpalatal suture even without surgery. For repair of transverse maxillary deficit, MARPE has proven to be a successful and viable surgery with a high success rate and stability. It is stated that MARPE is more effective than traditional RPE.

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Crown Lengthening As An Aesthetic Procedure: A Case Report

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Abstract

Maintaining a healthy periodontium around teeth is essential for regular functioning and aesthetics. Crown lengthening is a procedure that is attempted in order to improve both functioning as well as aesthetics. The procedure that will be employed for crown lengthening requires a sound knowledge of biologic width which has to be appropriately maintained under all circumstances. The ideal situation for the periodontium is localizing the filling/ prosthesis supragingivally, which is at least 3 mm from the alveolar process ridge. The gingival margin may be at times uneven and can hamper any other aesthetic procedure. Crown lengthening can be used to attain contoured gingival margin maintaining the biologic width.

This case report aims to present a case where in uneven gingival margins were corrected through crown lengthening by means of gingivectomy prior to veneering in order to obtain a satisfactory result.

Keywords: Crown Lengthening, Biologic Width, Gingivectomy, Aesthetics

Key Message: This case report will help us understand of using a procedure that was used to enhance the restoration of a tooth can also be used effectively as a cosmetic procedure.

Introduction

ne of the most commonly practiced procedures in modern day Periodontal practice is crown lengthening¹. In a survey conducted by American Academy of Periodontology, it was reported that nearly 10% of all periodontal surgical procedures are being performed to achieve gain in crown length². Treatment of crown or root fractures, altered passive eruption, subgingival caries, cervical root resorption and short clinical abutment as well as irregular gingival margin remain the main indications for employing procedures bringing about crown lengthening¹. It remains a matter of intense discussion whether crown lengthening can be performed in the anterior region simply for aesthetic purposes meanwhile its implication in the posterior areas have been studied to a substantial extent¹.

A visionary study conducted by Gargiulo et al³ stated that biologic width is the physiologic measure of the connective tissue attachment and junctional epithelium. The average dimension of the junctional epithelium and connective tissue attachment in humans were found in the study to be 0.97 mm and 1.07 mm respectively³. An average dimension of 2.04 mm was obtained after summing up the values as a result for the biologic width³. The integrity of the biologic width is considered a necessary step in restorative and prosthetic rehabilitations, to obtain and maintain healthy soft tissues¹.

A number of surgical techniques includes the broad subject of aesthetic crown lengthening, the aim of which is to provide better aesthetic appearance of the gingiva accompanied by the teeth and at the same time provide the patient with satisfaction and quality of life⁴. Cases where there is either excessive display of gingiva also known as "gummy smile", asymmetry of tooth length and gingiva or incomplete passive eruption or 'short tooth appearance' can be seen as areas that may require aesthetic crown legthening⁴.

This case report describes the procedure of aesthetic crown lengthening in a case of asymmetry of gingival margin.

Case Report

An 18 years old female patient was referred to the Department of Periodontology for the correction of the irregular gingival margin in relation to anterior teeth in the maxilla. The patient first reported to the Department of Conservative Dentistry with the complaint of wearing off of tooth surface in the anterior

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teeth. On examination it was observed that the patient had moderate fluorosis.

In order to improve the aesthetic of the patient while addressing the problem of wearing off of teeth, it was decided that the patient would be given composite veneers. The patient was referred to Periodontology in order to improve the irregular position of the gingival margin in relation to the anterior teeth in the maxilla before composite veneering was done.

The 'golden standard' aesthetic proportion in relation to tooth numbers 11 and 21 was more than 80%, thus indicating that the width is more than the length of the crown and similar conclusion was drawn for the maxillary lateral incisors(Fig1). On transgingival probing the bone level was seen to be appropriate and thus, gingivectomy method was decided to increase the crown length. The routine investigations the patient was asked to undergo were complete blood picture and viral makers. An orthopantamogram was also taken to further assess the level of bone. The entire procedure was explained to the patient in detail and an informed consent was taken.

The intraoral anti-sepsis was performed with 0.2% Chlorhexidine rinse for 1 minute. Infraorbital block was achieved by giving 1.8ml of 2% Lidocaine with 1:200,000 epinephrine bilaterally for anaesthesia. The surgical procedure was started

after marking the pockets with Crane Kaplan pocket marker along the gingival margins of the involved teeth(Fig2). Gingivectomy using #15 bard parker blade was performed while maintaining the proper contour of the gingival margin along the maxillary anterior teeth(Fig3). The external bevel incision was utilized for the gingivectomy. Approximately 2mm of the gingiva was removed in order to gain the desired length of the tooth. Once the procedure was completed Coe-pak was applied and the patient was recalled after 14 days(Fig 4).

The post-operative prescription included analgesics and an antimicrobial rinse (Chlorhexidine Mouthwash 0.2%) for 7days. The postoperative instructions included application of ice pack, soft diet, warm saline rinses 24 hours after surgery. Amoxicillin (500mg TDS for 5 days) and combination of Ibuprofen and Paracetamol (400 mg + 325 mg TDS for 5 days) was prescribed to the patient. Postoperative healing was uneventful. The patient did not complain of any pain or discomfort.

The patient was re-evaluated 14 days after the gingivectomy. The patient demonstrated good healing and improved gingival contour in relation to the maxillary anterior teeth. The composite veneering was completed in the Department of Conservative Dentistry one week after the follow up(Fig5). The patient demonstrated good aesthetics and was satisfied with the same.



Fig 1 : Pre-operative

Fig 2 : Pocket marked using Pocket marker



Fig 3 : After removal of the lining

Fig 4 : Coe Pak placement

Fig 5 : Follow up after 1 month

Discussion

Since aesthetic crown lengthening is an elective procedure meant to improve the aesthetics of the patient's gingiva and teeth, the patient should thus receive this treatment only if they believe that the treatment will make them more satisfied.

For aesthetic crown lengthening the gingivectomy procedure helps in exposing the required additional tooth structure, therefore the amount of keratinized tissue that must be present is around 2 to 5 mm for the gingiva to remain healthy^{5.6}. The papilla is an essential aspect of the surgery. The reason as to why the procedure is to be done has to be understood first, before the technique to perform is decided. There are three main causes wherein the need for aesthetic crown can be needed, they are excessive gingival display or gummy smile, asymmetry of tooth length and gingival margins, passive eruption or short teeth.

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The method that maybe employed for enhancing the length of the teeth can be by gingivectomy method wherein the resection of bone is not required. When the bone level is found to be less than 3mm from the freshly created level of the gingival margin, a full thickness flap has to be opted for in order to preserve the biologic width and also bring about the desired amount of crown lengthening by means of bone resection⁷. Gingivectomy is performed using blades or specially designed knives, Kirkland and Orban knives. Some clinicians prefer to use diode lasers for procedures like gingivectomy/gingivoplasty instead of knives due to its advantages of having strokes that are gentle and providing a bloodless intra-operative field⁴. The minimal apically displaced flap is very practical when a small amount of gingival margin is to be removed and bone resection is needed.

In this case report gingivectomy method was preferred for the process of increasing the length of the crowns in the aesthetic zone as the bone was sufficient which was found out by transgingival probing. Care should be taken to ensure that the new gingival margin does not extend to or beyond the mucogingival junction.

Conclusion

In conclusion it should be remembered that each case should be evaluated individually, in order to understand whether crown lengthening is required or not. The choice of procedure depends on the clinician's experience and expertise. However, the knowledge of each procedure is essential as it would help to modify the procedure during the course of treatment if the need arises.

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